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Red Herrings and Misconceptions

(AN EDITORIAL)

ANY CHANGE in the usual way of doing things upsets all but the most adventurous human beings. Hence, changes as basic as those involved in the general education movement are quite naturally causing some alarm, confusion, and resentment among educators. This uneasiness, normal under such circumstances is unhappily increased by widespread misunderstanding of the relation between general education and the other activities of colleges and universities. The welfare of students as well as the public interest require the early correction of existing misconceptions and the clarification of false issues.

The place of general education in the total institutional economy is not understood. For example, it is asserted that the development of general studies will reduce or stop the research activities of the faculty. This statement contains certain unexpressed assumptions which require analysis. No one acquainted with the incalculable benefits which fruitful research has conferred on American society and mankind generally would wish to impede the search for new knowledge. Indeed, unless research into current social and political problems soon reveals the means by which the members of various races, creeds, and nationalities can live together in peace and harmony, it is doubtful whether civilization can survive at all. Any changes in the ends of higher education restrictive of the research activities of qualified scholars would be detrimental to higher education and to the nation.

Granting the importance of research, however, the question must be asked — how many members of college faculties are qualified to do research, and, of those qualified how many actually do it? If past experience is any guide the answer must be that the percentage is very small. Mathematicians for example, after a study of the scholarly production of those who hold the doctor's degree in that field, stated that, "it is no apparent overstatement to assert that, under present conditions, at least 80 per cent of those receiving the doctorate in mathematics will publish no useful research beyond their doctoral theses." [1] To the extent that mathematicians are representative it is clear that relatively few teachers make genuine contributions to knowledge. In the face of these facts, to hold the development of general education responsible for obstructing, or even deterring research is really making a mountain out of a mole hill.

Many, however, who lack the aptitude for investigative work are or could become superior teachers if they were encouraged to do so. Does not every student know wise and skillful teachers without a scholarly article to their names who annually send forth from their classrooms men and women with minds rich in knowledge and pregnant with wisdom? What a crime to bedevil these teachers with the idea that their toil is unworthy because they do not produce scholarly literature! Teachers with little capacity for and interest in

[1] The Commission on the Training and Utilization of Advanced Students of Mathematics (E. J. Moulton, chairman), "Report on the Training of Teachers of Mathematics," *American Mathematical Monthly*, Vol. XLII, No. 5, May 1935.

research who have alert, inquiring, and reflective minds, and what is more important, a lively and lasting interest in human beings, should be persuaded in every possible way to give themselves fully to their noble calling. Our institutions of higher education will not discharge their full responsibilities to the society which supports them until it is recognized that those who educate the young for the trying responsibilities of our time contribute as much to the general good as those whose names grace the pages of scholarly journals. Research is important, but so is teaching, even teaching students who can not and should not devote their lives to learning. Until this principle is reflected in the graduate program for college teachers and in their salaries there will be no genuine reform in college education in spite of the present ubiquitous tinkering with the curriculum.

But investigation and teaching need not be mutually exclusive activities. Some who have gained fame in the library and the laboratory have also excelled in the classroom. When the University of Chicago introduced survey courses a few years ago they were taught by some of the most distinguished scholars in America. Since these men continued to be active scholars, their teaching of general courses apparently did not halt their creative work, but to the extent that their research was curtailed they must have considered the expenditure of time and effort justified.

General education, it is further contended, interferes with the teaching of advanced courses. In considering the implications of this allegation the question must be asked, "What is the function of college education in America?" Though the language may vary, these institutions uniformly declare one of their primary objectives to be the broad, liberal education of the student for a thoughtful and informed life in a free society. They use many fine expressions in describing the values of a general education as contrasted with specialized, vocational training. Catalogues reveal, however, that most courses are ill-designed to stimulate broad intellectual growth. On the contrary they carry the student into narrower and narrower branches of subject matter far removed from the roots of contemporary problems and the nourishing soil of the liberal tradition. The colleges will not realize their high purpose of freeing the mind and the spirit of man as long as they imitate and remain subservient to the specialized interests of the graduate and professional schools. In deprecating the college education of those who apply for admission to the Harvard School of Business Administration, Dean Donham points out that:

> The specialized training in our universities — and the universities are mainly responsible for the inadequacies of the liberal arts colleges — has sub-divided human experience into minute segments. Yet life as it is lived in human experience is integrated into a unity by every individual who is not a case for the psychiatrist or the insane hospital. We have assumed that there are many different subjects for education, with no effort to show that those different subjects have any unity. General education has disappeared everywhere.[2]

But the objection that general education interferes with advanced instruction should be examined from another point of view. Fifty percent of college freshmen leave before the beginning of the junior year, a fact exhibited in the smaller numbers in advanced subjects. Even in large universities many senior college classes are attended by fewer than ten students while as many as five hundred are not uncommonly crowded into lectures in general courses constituting the core of liberal studies. When it is recalled that general courses are often taught by instructors aided by graduate assistants in order that the ranking members of the staff may devote their time and energy to a few advanced students and to research, the real value placed on the general education of the young for their responsibilities as citizens, parents, and active participants in the life of their time is distressingly apparent. Those who object to general education on the ground that it interferes with advanced instruction misconceive the purposes of college education in a democracy. If the

[2] Transactions and Proceedings of the National Association of State Universities in the United States of America, Vol. XLIII, 1945, p. 50.

colleges exist for the training of specialists and technicians, other agencies should be established for the education of young people for the responsibilities of citizenship and for the cultivation of the mental, moral, and spiritual traits which characterize the free, self-confident, and socially-minded human being.

But again it is fallacious to assume that teachers of general courses must cut themselves off from or disqualify themselves for advanced teaching. Like their associates who do research, many teachers of advanced courses also excel in general subjects. Attitudes are important in this situation. If teaching courses for those who do not intend to continue in the field is considered undignified and unworthy of the time and effort involved, they will be a nuisance and an interference with the giving of advanced instruction. But if the teacher accepts these responsibilities in the light of their importance to American youth and to the welfare of the nation, he will find that after such courses have been organized and given once or twice they will consume no more time and effort than other instruction and they will be immensely rewarding in human satisfaction.

Concerned again about the interests of advanced students, faculty members often object that courses comprehending several related fields prevent the student from covering the elementary systematic instruction required for further work in a single discipline. The physicist, for example, may approve a course in general science for non-majors, but declare such instruction inadequate for future physicists, chemists, or physicians on the ground that the material will be duplicated in other courses.

Early survey courses were, to be sure, little more than unrelated sections of elementary material somewhat compressed in order to cover a wider variety of subject matter than was possible in a single elementary course. Today, however, the best general courses are differently organized, and do not significantly duplicate either elementary or advanced instruction. They emphasize method rather than subject matter, and reveal the place of science in modern life. Great scientific discoveries chosen from various ages and fields reveal the evolution of scientific thinking and show how the application of experimental method and the exercise of detached judgment have advanced human thought at the expense of prejudice, superstition, and vague philosophizing. Such instruction, valuable even to the future scientist, demonstrates the general applicability of scientific method to all types of human problems, an end of education often not achieved. In considering the degree of repetition of material, it should also be remembered that present curriculum organization makes it possible for the student to neglect whole areas of knowledge even in his own field. A student may leave the graduate school with a Ph. D. degree in a scientific field like physics, for example, without having had any instruction in zoology, botany, geology, astronomy, bacteriology, physiology, anatomy, hygiene, and nutrition, sciences involved in the preservation of personal and public health and which now commonly constitute a part of general courses in science. The ignorance of other fields not closely related to the sciences is another point which need not be expanded here; the argument holds there all the more. Hence the likelihood of wasteful overlapping between a general course in science and the specialized courses in the various related fields can be greatly exaggerated.

Paradoxically general courses are said not to prepare the student for advanced instruction in his own or any other field. This contention disregards the possibility that a second course may also be revised to articulate with the beginning course in the field. But assuming the continuance of the present advanced courses it is complained that the student who takes a general course in the social sciences and then majors in political science has wasted his time because he is not prepared for further study in the field. This sequence delays the beginning of specialization a year later than would be possible if a first course in government were elected in the freshman year. If, however, the social science course is properly organized and taught, the student would learn more about the

principles of social science and its generalizations concerning human behavior than he would in the elementary course in political science. Those who have had experience with general studies believe them to be as good preparation for advanced study as elementary courses.[3]

Even if the introduction of general courses does cause some difficulty for students who major in the various disciplines, it is proper to inquire whether the college exists primarily for this small group of students or for the 90 percent or more who should acquire a general understanding of the world in which they live. The interests of the majority of college students who leave college before reaching the junior year and hence never receive any advanced instruction must also be considered. To say that to lower the quality of instruction to the level of the 90 percent is unfair to those who need advanced instruction is misleading too because among the 90 percent are the able students in all other departments who do not expect to pursue more than one course in fields unrelated to their own. If there are wide variations in ability, which in any event would probably be no greater than among future majors in any particular department, appropriate adjustment can be made in teaching methods.

In a nation in which dissemination of knowledge among the people is the basis of good government and the full life, the organization of higher education around the interests and purposes of so small a percentage of our future citizens is one of questionable wisdom. Faced as we are today with the task of mere survival in a world of competition, misunderstanding, and difficult communication, it is urgently necessary that more attention be given to the education of the thousands of high school and college students who, though they will not become scholars will, whether we like it or not, in a democracy decide the welfare of all. In the light of this situation, the arguments of those who reason that the development of programs of effective general education will interfere with research, impair the quality of advanced instruction, and cause difficulties in arranging the college curriculum for students who expect to become specialists in one of the disciplines, are not compelling.

That the reorganization of liberal education to provide a general education for all American youth will cause some confusion and inconvenience is admitted. True it is that the rededication of liberal education to its earlier purposes of freeing the human spirit from ignorance, prejudice, and provincialism, and of releasing the energies of men for the achievement of the good life, will require a change in the thinking of many educators, and laymen as well. The issues are of such decisive import in the life of man at this juncture in human history that they should not be obscured by false premises, invalid reasoning, vested interests, and the distortive influence of tradition. Few responsibilities of men are more weighted with human destiny than those of the educators in our liberal arts colleges who must decide now what education is of most worth. Will they train specialists and technicians, — or will they educate free men capable of creating and living in a free world?

[3] See article by Herskovits in this issue.

*Freedom or Authority**

BY J. I. SEWALL

THERE IS a general tendency in American colleges to abandon free election in favor of some sort of prescribed curriculum. This is shortsighted and unfortunate. I should like to review the question, and set forth the arguments in favor of freedom.

There are advantages to a curriculum based upon a set of prescribed courses which are specified by the faculty as essential and are required of all. At the very least, such a system tends to standardize the student. This is a convenience to teachers of upper courses, since they are enabled to rely upon a background common to all members of the class. There is also the advantage that the aims and objectives of the institution are given sharp definition, a quality which many persons prize above all others. Ostensibly, the list of requirements is a convenient administrative device whereby every student is automatically given the benefit of the faculty's best judgment, this being presumed to be better than his own.

These, in general, are the arguments for the prescribed curriculum. In a confused world, they are attractive arguments. They seem to have direction. They appear to take firm hold on the fundamentals. They give one a sense of having done something.

There has been very little airing of the arguments on the other side. Indeed, there is no impertinence in the suggestion that many colleges have undertaken the prescribed curriculum too hastily and without a sober consideration of all its implications. These ought to be stated.

It is the argument-from-authority which alone can justify the prescribed curriculum; and it is the essential weakness of this argument which marks such curricula as a retrograde movement in American education. Let us assume for the moment that college faculties, deans, and presidents are something that they never are, namely disinterested and judicial. Assume that there are no balances and tensions on the faculty, that every member of every department is able to understand the spirit and intention of every other member and every other department, and weigh these interests as equal to his own. Let us still further assume that these honest and serious people, these conscientious authoritarians, are undertaking to draw up a list of fundamental courses. The difficulties which will confront them are perplexing to a degree. Here are some of them.

Any list of required courses must pick and choose between the various subjects and disciplines which constitute a liberal education. It must demand some and suppress others. This is dictated by physical necessity. The American college course lasts four years. There isn't any more time. Indeed, there is often less, since we must define the length of an accelerated program as about 125 semester hours, usually undigested. It is impossible to suppose that we can in this space of time make a boy familiar with Plato; teach him to write a decent English style; give him a reading knowl-

* EDITOR'S NOTE. The author of this article was a member of the Curriculum Committee of the College of Arts and Sciences at the University of Buffalo. He is the writer of the final draft of that committee's report which was adopted by vote of the faculty. The views here, however, must be construed as those of the author.

edge of French and German; take him well into the Calculus; make him work in the laboratory until he understands the scientific method; inculcate the historical point of view; define for him the great social and economic problems of the day, and start him on the road to their solution; and, in addition to all this, nourish his imagination and mature his emotions with Mozart, Giotto, Shakespeare, and Chaucer.

There is simply too much material and too little time. We can not do all that is desirable; we can only do part of it. There is no way whereby the authoritarian, however honorable his motives, can escape the onus of declaring that Hooke's Law is more "fundamental" than the frescoes of the Arena Chapel, or that Hamlet is more "basic" than the Magna Charta. These are choices between equal values. There is no way to make them without denying the principle that all fields of learning are of equal worth and equal dignity.

Unwilling to face the implications of this fact but still desirous of controlling the student, many faculties (or more accurately, many administrators) have tried to improve the efficiency of the curriculum by the introduction of what we may properly call super-survey courses. These usually bear such titles as The Humanities, Western Civilization, The Social Studies, or The Essentials of Science. They purport to combine the best points of several traditional subjects, thus educating the student faster. They also purport to relate one thing to another in such a way that the student gains perspective.

Ideally, a set of well outlined super-survey courses might provide the basic common background which is the prime objective of a prescribed curriculum. The casual way in which many colleges have undertaken to organize them makes one wonder, however, about the analytical powers of the average college president. The problems, both financial and human, are very great. No graduate school prepares a man to teach such a course. A very wealthy college can get around this now and again by spending a great deal of money to train its incumbent faculty for a specific course; but for institutions that cannot think in terms of dollars by the hundred thousand, there is no way to get competent instruction until our graduate schools are reorganized and oriented differently. However bitter the truth, it must be stated also that the fruition of such courses is hindered if not curtailed by the customs of promotion and tenure which obtain today. The development of a new type of course is, by comparison to traditional research and publication, a risk that no young teacher should take, and an enterprise which no administrator can honorably urge upon him. In a few cases, these difficulties have actually been overcome. In most cases, however, where the super-survey course has remained on the books for a period of years, local analysis will reveal the familiar difference between what the catalogue says and what actually goes on. We may sum up by saying that present circumstances conspire against the success of the super-survey course; and the prescribed curriculum organized around such courses will prove inadequate.

There is another popular method which seeks to escape from the necessity of choosing one subject and suppressing another. This is divisional prescription, most curricula being catalogued under several general headings like the social studies; the physical sciences; language; literature, and the arts. It is suggested that we hardly trespass against freedom at all when we require that a student sample each of these very broad divisions of learning. No student wise enough to be allowed at large, we are told, would care to "overspecialize" to the point of taking no laboratory science, while those who might wish to avoid foreign languages do so from moral weakness, and need not freedom but discipline. In any case, we hear further, a student who cannot find something he likes in every division is a sore-head and a quibbler with whom we ought not to bother.

There are various difficulties which make divisional prescription specious rather than sound. These are both practical and theoretical.

Except at the very large universities where, for example, all the sciences and all the languages are

offered and where they are all represented by large and competent departments, divisional prescription is substantially the same as a list of required courses. By accidents of the schedule, by the existence of unpleasant personalities in the department of chemistry, and by the nonavailability of astronomy, geology, botany, and biology, a requirement in the division of sciences has been known to operate as a watertight tariff protecting Physics 1-2.

Another difficulty less easy to prove but one that operates at all institutions both large and small is the discrepancy between what does result and what ought to result from the experience of taking certain courses. Exposure to the laboratory, for example, may not and in some departments certainly does not impart an understanding of the place of science in the modern world. In certain colleges, the desired result could be better accomplished by requiring a course in philosophy. These remarks are offensive, perhaps; but the specific instances which illustrate them are all too frequently available. The general principle involved is this: titles of departments are not a reliable index to the results we will get if we require courses therein. Local investigation is necessary in every case.

Another trouble with divisional prescription is the extreme difficulty of arranging a course which is sufficiently complete in itself to meet the needs of those who take it for purpose of "distribution," and which is, at the same time, an adequate first step for the prospective specialist in the field. This problem is not insoluble; but it is a fortunate college that can lay claim to a fifty percent record of solution. Until this situation is remedied, the alleged benefits of divisional distribution are more of a hope than a reality.

The divisions themselves, to add a final word to this aspect of the problem, cannot seriously be held to represent a reliable separation of knowledge into its component parts. They are a piece of administrative machinery; indeed, even as machinery the divisions have very little reality. They exist as an aid to outlining the catalogue. Whenever any one exerts upon them his talents for artificial respiration, he gets into a peck of trouble. The divisional categories radically oversimplify what is actually done by the various departments. Psychology, for example, is a social study, a science, and an art; if it is not all three, it is a dangerous subject. Philosophy is history; it is certainly one of the humanities, and it often merges into mathematics. Literature by imperceptible steps becomes philosophy. The divisions neglect all these bonds of unity whereby a single subject participates in man's unending effort to understand himself and his environment. The better a curriculum becomes, the less valid are the divisional separations. If all courses are well taught, the student will get the scientific point of view everywhere; he will get language sense everywhere; he will get a sense of past and present everywhere.

We must turn our attention now to the relationship between curricular revision at the undergraduate level, and the training available to prospective teachers in our various graduate schools. This is the most important single aspect of higher education. It affects both the free and the prescribed curriculum; but of the two, it would appear to add more heavily to the worries of the authoritarian. We have alluded to this matter before, and we must now deal with it directly. No amount of repetition can possibly overemphasize its importance.

College education is not child's play. No man is competent to teach at this level simply because he is a good technician in the classroom; this is the error which has so far denied to the Schools of Education the general respect of scholars. A college teacher must be a learned man. He must have at his command a corpus of knowledge; and he must be able to erect a structure of thought more complex, more profound, and more powerful than his students have experienced in any part of their earlier training. There is just one source of such men, and that is the graduate school. If you wish to reform undergraduate teaching, if you want super-survey courses, interdepartmental cooperation, science for the common man, better ways to teach languages; if, in brief, you want any of the new things which are consistently associated

with curricular overhaul, don't attempt it with men formed in an older and different tradition. Get after the graduate schools, and make it hurt when you do. If in the meantime you feel compelled to set up a new curriculum with a clever set of required courses, make sure that these are sufficiently conventional to fit the teachers you have available. Otherwise, you will be rightly accused of providing incompetent instruction. This will smell badly for all your perfumed talk about doing it "on an experimental basis."

These harsh statements may at first glance seem unkind and unjust to the exceptional men and women who have upon occasion made a success of an educational novelty. Such success is rare, however. When it occurs, it is the product of faith, courage, devotion, wide learning, and stupendous labor. We must stipulate, also, that versatility and a high creative imagination are required. Persons of this calibre are rare on college faculties and everywhere else. There seems to be a general impression, for example, that a professor of English can line up a good course in the humanities by reading a few books on art and music, and recasting his lecture notes for next year. This train of thought would confuse Mount Everest with a pebble. From the standpoint of factual knowledge, the average first-class teacher of English knows less about art than the new graduate students who walk up the steps of the Fogg Museum each autumn. If he tried to enter any self-respecting Conservatory of Music, he would be stopped in the lobby. And yet we can cite examples of colleges that have asked men to learn two new subjects between June and September, and to demonstrate by October first a power of synthesis that begins, figuratively, where Aristotle left off the day he finished his *Poetics*. Unfortunately, schemes for collaboration between experts almost uniformly fall down in practice. They offer us no way out. For all practical purposes, good teaching depends upon the power of the single teacher. He learns, he knows, he digests, he arranges, he sorts, and he analyzes; at length, he brings forth a new thing. Persons who can thus combine and re-create in terms of entire fields or disciplines are unusual men. We have no right to employ them as teachers of freshmen. They are not line officers; they are strategists. They should occupy key positions at our leading graduate schools.

A final reason for the negation of general requirements (and one which is enough in itself to carry conviction) is the fact that such requirements inevitably result in courses that have a vested interest in enrollment. Although there is nothing in the theoretical nature of vested interests to make them bad, and although they have often been an influence for stability and even for good, there is certainly much in human nature which warns us to avoid them. There is also plenty in the history of education.

Have we learned nothing from the fate of the classics? Five hundred years ago, Latin was alive with a ferment of genius and Greek, available only to a fortunate few, looked like the hope of heaven. Education without the classics appeared to be a contradiction in terms. This belief became an educational tradition. The ancient languages were rigorously inflicted upon the young at all our best schools, and were required both for entrance and in course by some of our best colleges until well after the first World War. Where are they now? Reduced to pedantry and routine long before our time, they still maintained their favored place in the curriculum of our more conservative colleges until it became clear that the average parent, for all his good-natured vagueness on academic matters, was no longer fooled by the statement that the classics were indispensible. He would not force his children to study these languages which were dead because the humanity had been squeezed out of them. He merely let his children go to schools that did not require Latin. There is a double edge to this tragedy. Community opinion was too slow to save generations of youngsters from mistreatment at the hands of intellectual bullies who ground souls along with gerunds; and we have lost Latin and Greek. That is, we have lost them unless they can be called back into useful life by the small group of honorable men who are start-

ing again, as it were, from the bottom, and who believe that the classics can win by dealing a fair hand as contrasted to the stacked deck of requirements.

There is no reason to believe that our new required courses will not run through the same cycle. Indeed, it is to be predicted that they will. We pass a requirement today. The students enroll because they must. It is unnecessary to convince them that the requirement is valid. Presently, the instructor forgets that he is under an obligation to justify himself to each succeeding generation of students; the next generation will arrive anyway. The course loses for the instructor himself the zest of a new thing; he does his work with routine efficiency. Finally, the reasoning which called the course into being becomes dim in his memory; he no longer feels the challenge of contributing to the lives of his students. At this point, an academic abuse has established itself, usually so firmly that a major upheaval of the faculty is needed to correct the situation.

Unfortunately, this cycle does not proceed fast enough to attract attention. In the twenty years or so that it takes to reach the stage of abuse, many a good and sincere man will see the thing in process without sensing the import of what he is witnessing. The faculty that votes the requirement into effect today has changed, married, moved on, and died off. They are not there to focus upon the effect for which they have laid the cause. By the time the harm is done, the vital young teacher has become the department head, with tenure, prestige, secretaries, and perquisites. He will be an accomplished technician in the ways of the world; and he will know how to maintain his interests by keeping the requirement in effect.

All of these arguments make it very hard to see how the authoritarian can have confidence in his authority. He must be certain that he is unbiased, he must perpetuate some subjects and kill others — or he must find new ways to keep them all alive by being the first man to make them work in successful combination, he must reform the graduate schools or devise adequate substitutes for them, he must control and even correct some of the less fortunate tendencies in human nature. Even if the authoritarian can solve all these problems and even if he can prepare the ideal list of required courses, he will still be defeated by circumstances beyond his control. The American community will not permit a prescribed curriculum to succeed. This is a large statement and a hard statement. It requires considerable explanation.

A wise man once said that the strength of the British Empire lay in the general acceptance of the concept that the failures should not only starve in the gutter, but *do it decently*. No such theory exists in America. This is not the place to debate whether it should exist; we are concerned here with the effect of the facts upon college education.

Every teacher knows that the C-student is going to pass. This is one of our folkways. Exceptions are permitted only in technical education, and then only to institutions of the very highest standing: our leading law schools, our leading institutes of technology, our leading conservatories of music, the military and naval academies. At all other places, the C-student is going to pass, or the community will destroy the college.

At almost all colleges, the grade called C is defined as the grade given for work that is satisfactory. This is something of a euphemism, for the term *satisfactory* has a different meaning when applied to the work of doctors, lawyers, plumbers, carpenters, and other citizens upon whose competence society must rely. Some colleges are stiffer than other colleges; but the C is not hard to get anywhere. It is, in fact, the grade that can be obtained by the average young American, male or female, with a little work and a little cramming. It would be unjust to suggest that these young people get nothing out of college. With so much sadness in the world, the college justifies its existence if it does nothing more than provide our young people with four years when they are gay and free from care. But we are drooling down our bibs if we equate college at the C-level with higher education, or if we take seriously the "common background" in "fundamentals" acquired from a

series of prescribed courses passed no higher than the grade of C. Unless we can find a way to raise our standards well above this, we might as well default this whole problem. It will make no difference whether our freshmen take super-survey humanities or old fashioned rhetoric. Neither will hurt them, and both will do a little good.

This is a bitter problem for us to face. Every teacher who is sensitive to the trend of atmosphere knows that the standard for the C is going down. A much larger block of the population now finishes high school and enters college. This means that the third fifth of every high school class is less selected and therefore academically inferior to the group in the same category at the same high school twenty years ago. The G. I. Bill has possibilities for good that are almost Utopian; but in establishing the principle (which will almost certainly be permanent in some form) that college education should be made available to all at public expense, this bill will result in suggesting college entrance to an even larger proportion of the population. This larger group will include the able youngsters to whom society owes an education no matter how much it costs; but we are sentimental if we do not realize that we must consume our dross before we can refine our gold. We are going to have to accommodate a very large number of students who are academically inferior. It is fatuous to suggest that we meet this social ground swell by raising our entrance standards to an exclusive level, or by flunking out any substantial proportion of those who enter. Whether you blame it on Mr. Roosevelt or not, and whether you call it idealism or folly, the American public is not reconciled to the failure of any large number of persons. Admission to college is going to be demanded as a right by every boy who wants to go, the average boy and the exceptional boy alike. Admission has always carried with it the presumption that graduation is within the capacity of the student. This presumption will be very much abused. It is only natural that people who have had little contact with college education should think of it as something you can buy if you have the money; there is no general sympathy with the idea that college is a test of the student's capacity. Mr. Pound is the only dean who has ever looked an entering class in the face and said, "Look at the man next to you; he won't be here next year." There will be a great deal of rationalizing talk; but in the end, we will admit and graduate all of these average young Americans. Indeed, in a democracy, that is probably what we ought to do. At any rate, you can sense in the remarks of Mr. Dewey and others what will happen if college professors set themselves up as an intellectual élite and adopt exclusive policies. The people will found new universities and operate them as they think best.

This is a very large question; we cannot possibly give it full discussion here. With respect to curricular organization, however, it ought to give the authoritarian a nasty shock. He promises too much. He claims that he knows the fundamentals; he says he has a curriculum that implements them; he is so sure of himself that he is determined to get good results by making students take the courses he specifies. This is what they do in a limited field and with a selected group of students at Annapolis and at West Point. How is it going to work when authority has no power to enforce discipline?

As a matter of remote possibility, all of these objections to the authoritarian concept might be met. It is perhaps unlikely that all of them would come to a focus simultaneously at a particular institution. But any one of them, allowed to remain outstanding, is cogent enough to ruin the best planned list of required courses. This means that the conscientious authoritarian will wear a lean and hungry look; he cannot sleep at night; he is responsible for a program that is susceptible to every bug that flies.

Free election is a much better principle than prescription. In the first place, it is consistent with the ideals upon which this republic was founded. There is no way to combine the advantages of regimentation with the advantages of freedom. You have got to believe in one or the

other. The middle ground of limited freedom looks like tyranny and it is tyranny from the point of view of those upon whom the yoke of compulsion falls. There is no way to get out of this except dishonesty. You cannot force a man to act as you wish and in reverse of his own judgment unless you are willing to assert the authoritarian principle. This is apparently what many colleges actually wish to do. It is odd that no one seems worried about it. A little while ago, we were explaining to our young people that they must be willing to die in an effort to kill the authoritarian principle in government; now we expect them to accept it and like it in the government of colleges and universities.

This is not an abstract discussion. Ideals are right there every minute as a force in human motivation. This is particularly true of undergraduates; they are not yet resigned to the techniques of making an allowance for stupidity, bluff, front, and fraud — and the hope of the world lies in this lack of resignation. If they want anything from the faculty, the undergraduates want the faculty to have its hands clean with respect to ideals. Exactly what do we do when we bring a boy up to love freedom, and then confront him with a set of omnibus and sumptuary requirements? We make him feel cornered. We add to his effort of learning the burden of putting a restraint upon the sense of resentment we have told him he should feel whenever his birthright is threatened. In short, we do a shabby thing, and we make it difficult for him to be loyal to the faculty. It would be different if the student could escape by the simple expedient of leaving college; but this move is rendered taboo by a focus of family and social pressure.

One may well ask, if this is so, why we have so little trouble with students who are thus alleged to suffer from feelings of injustice. The answer is a sordid one. Undergraduates, individually and collectively, have no power in the American community. All the facilities of money, publicity, and social pressure are controlled by persons of middle age and upward. It makes no difference how the youngsters feel; they can *do* nothing that will embarrass the administration.

We do not solve all the problems either of education or of humanity by allowing the student to be the final judge in matters of course selection. We do, however, avoid the evils upon which we have dwelt so long; and the evils which we bring upon ourselves are small by comparison. Let us examine the free curriculum, both in theory and in practice.

A curriculum organized on the principle of free election is basically sound in America because it corresponds to the ideals we have been preaching and defending since 1776. A student who enters a college with the free curriculum senses this correspondence at once. No one is forcing him into a mold that does not fit. The faculty promises to teach him physics if he elects it, but does not set itself up to understand and teach the basic fundamentals which, as any man with horse sense knows, still remain undetermined. A boy who loves Homer is not constrained to waste his time on thermodynamics, and the boy who loves engines is not subjected to the puzzle of French culture as it is dimly revealed in the conjugation of *être*. The entering student feels, in short, that the college is not only living up to the ideals he has been taught, but that it is opening up to him the wide door of learning. This not only can have, but usually does have a massive effect upon his spirits. The prospect of possible accomplishment is inspiring; and the responsibility for steering his own course is sobering. He can do what he wants; but in paying the bill for his own mistakes, he bears the burden of all free men.

There are dangers to this freedom, but they are not so great as the dangers which inhere in the doubtful competence of authority. The college that undertakes the free curriculum is much better able to handle the influx of marginal cases which seems to be upon us. It does not describe the type of man it promises to produce, and it does not say, "Take our courses and get your feet on solid ground." It merely offers its facilities to all students who can get the required number of C's; and

it puts no barriers and no hurdles in the path of the student who is strongly motivated and who can forge on to a level of high accomplishment. It can do everything that the prescribed curriculum can possibly do; and it is morally in the clear when it does not do this for all men.

The college with a free curriculum is under an obligation to provide an adequate advisory service. This must be elaborate and expensive if every individual student is to be given the attention appropriate to his dignity as a human being, and provided with the information that he needs in order to make his decisions. The teaching faculty can not properly escape the responsibility for participating in the advisory function, but it cannot possibly add this duty to those it already has. This is where most advisory systems fall down.

There must be a special staff of persons trained in the necessary techniques, psychological and otherwise. There must be facilities for the administration of all useful tests, and people who can interpret them without going off the deep end. This, in outline, is the advisory service provided at the University of Buffalo, where a free curriculum is successfully operated. It works well. Experience reveals, of course, that no system will be free from human error; but also that the free curriculum, which might otherwise entail confusion and lost motion, can run as smoothly as any other if the advisory service is adequate. Without such a service — and it must be emphasized once again that this means a service with real drive in it — a free curriculum is irresponsible.

One often hears the objection that undergraduates are adolescents, and ought not to be permitted to act at variance with the dictates of their elders and betters, especially when these be made available by an organization so soundly based and so elaborate as the one we describe above. To the conception of the undergraduate as an adolescent, there is no reply that will carry conviction, since the conception itself is irrational. This is the age of the gray beards. Anthony Eden and Thomas Dewey are still considered dangerously young. It is useless to cite the time of life at which Alexander the Great and Napoleon reached positions of responsibility. Similarly, it is ineffective to point out that sea captains of twenty-one were not uncommon a hundred years ago, or that our young people discharged with honor the entire catalog of responsibility placed upon them by World War II. We still hear of amusing instances where the commander of a four-motored bomber is, for reasons of immaturity, refused his parents' permission to obtain a driver's license. One of the baleful effects of modern medicine is the fact that old gentlemen feel so well. They continue to enjoy running the show, and they find it good tactics to impeach the competence of the rising generation. In my somewhat timid youth, I never wholly subscribed to the idea that better judgment resulted from age and experience, but I thought there might be something in it. Having now both the age and the experience, I realize that the whole thing is a defense mechanism. Among my friends and relatives, I number not only my academic colleagues but doctors, lawyers, judges, engineers, architects both land and naval, inventors, fishermen, salesmen of everything from insurance to winches, advertising men, and drunkards. I have observed the action of these persons for some years, both in Europe and America. In general, their judgment is not very good; and yet they are substantial men, commanding in some cases salaries in the top brackets. How about the judgment of mature men like Chamberlain, Kimmel, and Short? We must realize that these tragic figures are truly symbolic of our society. They were put in power because they seemed to embody the qualities which our controlling elements like; and they made their mistakes by reaching their erroneous decisions according to methods which are in daily use by substantial men everywhere in England and in America. The errors of substantial men are usually covered up; but these men couldn't cover up. Their example should teach us that judgment is a function of information, intelligence, and imagination. Experience merely means that you have been there before. In a routine like taking liners in and out of New

York Harbor, a man who has been at it for years actually has time to see the parallel cases; but life as a whole and education in particular are no routine. Each decision is different in kind from the last, and no one lives long enough to experience enough parallels so that he may properly relax and judge things by analogy. We probably cannot supply intelligence or imagination to the freshman; but we can bring him into contact with advisers who have these qualities. We can most certainly furnish him with information. It is my experience that the ordinary freshman, given these facilities, can be trusted to govern his own educational destiny. At least he does it better than Hoover cured the depression.

There are other bugaboos which make the timid fear free election and which furnish the domineering with an excuse for continuing to run other peoples' lives. These can be listed about as follows. We are told that students will use their freedom (*a*) to elect snap courses, (*b*) to specialize at the expense of reasonable distribution, (*c*) to indulge weakness or cowardice by avoiding subjects for which they have a distaste, and (*d*) that students will play hob with everything by registering for courses for which they are unprepared. We will deal with these objections seriatim.

Let us turn first to the students who elect snap courses. It is a puzzle to know why any one worries about this. The hardest course is a snap if you can pass it with a D and can get a "Quality Point" with a C. In effect, we have long since endorsed the principle of the "pass degree" and the "honors degree." The labels on our diplomas are simply behind the times. They do it more openly in England. It is true, one is sorry to say, that courses do exist which are snaps beyond and below the general level. These are much less generally available than the layman has been led to believe. But when they do exist, why don't our mature and experienced presidents and deans do something about it? This is the remedy; no set of gerrymandering rules will get the same result as leadership and resolution.

The student who wishes to specialize is a more important problem. These youngsters have a reason for what they do. To use modern jargon, they are already motivated. No one can hope to analyze the motivation in all cases. The variations in individual taste and in temperament are too subtle and too complex. It is a waste of time to wrestle with the matter. The thing to do is to give the boy his head. If he wants to be a linguist, make him feel that every man on the faculty is behind him and all the facilities of the college are at his disposal. If he loves machinery, tell him to go to it. The induction system of a Diesel engine is as fine and as neat as any Latin sentence, and as pregnant with meaning. If you don't think so, it would be well to reflect upon the implications connoted by the names Watt and Ford, and to contrast these with any others you may choose. The principle involved here is one that should be more generally appreciated. *The common denominator of liberal education has to do with standards and with connotations.* The immensity of modern knowledge has outdated any definition that has to do with subject matter. Any course which makes the student extend himself and grow, any course that makes him see an aspect of life in relation to life as a whole, any course that leaves him better equipped to separate the plausible from the veritable — any course that does these things is so good that we are impertinent if we inquire whether its title be dressmaking or Beowulf. To the boy who has already chosen the field in which he desires to excel we do a positive disservice if we inflict upon him requirements designed to produce our own petty version of the well-rounded man.

It is unfortunate that a certain number of students dislike one field of study or another, and will always use free election to avoid it. This, in almost all cases, is the result of early training. So far as my personal observation goes, the subjects most often eschewed are those that require special skills and techniques, principally languages and mathematics. Somewhere in childhood, the student got off the track. He was improperly handled at home or in school, he was ill and never caught up,

or something else happened. These misfortunes cannot be remedied at the college level. The underlying maladjustments are serious; it is ignorant folly to suppose that we can cure a lifelong dislike for mathematics by requiring a course in college algebra. If we are going to do anything about these cases, we must provide remedial services at the medical level. This is hardly the function of the college; and fortunately, we don't really need to do it. There are so many good subjects and they are all so even in value that, once again, we are justified in giving the student his head. If he wishes to avoid French, let him avoid it; the chances are ten thousand to one that he will never arrive at that sense for the comparison of languages which is alleged to give one perspective on his native tongue. There is a full schedule for the boy in subjects to which he has no objection. He will be a better man getting an A in English than he will be if we force him to broaden himself by getting a D-plus in chemistry. If he was dropped on his head by his nurse and has a blind spot as a result, we can regret it, and go on from there.

It is always possible that students will use their freedom to elect courses for which they are not prepared. The only way to find out about this is to see what they do when they are free. It is my observation that students have a well-developed sense of self-preservation; they will keep out of this trouble. I can also cite instances where the desire to work in a favorite subject at a more mature level has resulted in the student's getting the prerequisite information on his own initiative. I recall vividly, for example, a recent case where a tutorial student undertook to get a reading knowledge of French and German even though she had "enough hours" to graduate without this extra work. These things happen when people are free. It is good to record that the particular youngster referred to was not only able to use her languages as tools, she learned to like them for themselves.

I should like to point out, also, in this connection that the faculty has a certain obligation to make every course complete in itself. This is a counsel of perfection; but it is nevertheless a good thing for the instructor to have in his class a certain proportion of students who lack technical preparation. You have to explain yourself to these people in terms that they understand; in the language of the educators, this is "relating knowledge to the life of the individual." If there is any "integrating the curriculum," this is it.

It is really too bad that some courses potentially interesting to many students are hedged about with a fence of prerequisites. Always interested in the sea (if I may be permitted an autobiographical illustration), I still think it a shame that I was, together with several friends, excluded from Celestial Navigation by the existence of prerequisites in Astronomy and in Spherical Trigonometry. My exclusion as an undergraduate has not prevented me in later years from both teaching this beautiful science and practicing the art. But how much richer my life would have been had I been introduced to it by a learned veteran; why did he have to keep us out when Captain Bowditch had opened the door so wide a hundred years ago? Modern tables are so good that the prerequisites were only necessary by a refinement of the theory of prerequisites.

Such are the arguments for a free curriculum. They do not, like the speculations of the pre-Socratics, exist *in vacuo*. I have observed the operation of the free curriculum at the University of Buffalo; and I have observed the operation of highly regimented curricula elsewhere. The advantage is strongly on the side of freedom; it is the better and the more practical principle.

But we must not lose sight of the fact that these things are not decided on the practical level. There are more modern words for it, but it is the spirit of the thing that counts. In the last analysis, the organization of the curriculum puts us to the question. Do we still believe in the ideal of freedom? Have we changed our ideals, and do we now believe in authority? If so, are we going to hoist the new colors like honest men? Are we going to explain to our children that Washington, Jefferson, and Jackson played a mug's game and that John Paul Jones was a misguided technician?

Or are we intending to participate in the general moral shabbiness of the twentieth century where any idealistic declaration is tacitly discounted as sales talk and window dressing, which the speaker will reverse in practice any time it is convenient or cheaper?

Between the free principle and the authoritarian principle, there is unfortunately no middle ground and no shelter for those who cannot make up their minds. The smell of the authoritarian is like that of the skunk; where a very little exists, there is no free air. It is all very well to cite the traffic regulations as an instance of freedom tempered by legitimate restraint. These deal with a minor and physical aspect of our lives. Their value is constantly checked by their success in regulating traffic. They continue in force, as a matter of fact, not by the power of the state but by the agreement of free men that they are desirable. They do not seek to impose a doubtful authority upon our souls. In the realm of the mind and the spirit, freedom is absolute or it does not exist.

Shall Higher Education be Expanded on the Technological Pattern?

BY WILLIAM E. WICKENDEN

IN THE light of events it appears that the issue between a stratified and an integral plan of education for the technological professions was settled twenty years ago in favor of the latter. By a stratified program is meant the two stages which have become traditional in the training of physicians, dentists, lawyers, and clergymen, the first including only general studies in the arts, sciences, and humanities, and the second devoted entirely to technical training for the profession proper. This issue was considered at length in the extended investigation of engineering education of 1923-29, and subsequent reports have developed and numerous acts have confirmed the decisions taken at that time. Furthermore, the intervening years have seen a pronounced swing of opinion toward the ideals and patterns of education which the engineering curriculum exemplifies. What was once regarded as a variant is now being regarded more and more as a modal type. If the great expansion of higher education predicted for the next decade is actually realized, it seems likely that much more of it will follow the mode established in engineering, at least in its general plan and outline, than the older traditions of the liberal arts. This prospect may give some timely significance to a discussion on general lines of the relation which the technological curriculum bears to general education.

It must be apparent to all that while technological education has grown more assured in its goals and processes, liberal education has been increasingly on the defensive, not only as to its organization and content but also as to its function as well. The recent war accentuated this contrast, but the underlying condition had been long in the making. To the author, these trends reflect the course of evolution through which American culture has been passing. Two world wars have served to heighten our sense of political, economic, and military interdependence with Europe, but equally have tended to increase our sense of cultural and technological self-sufficiency. It may be questioned, of course, whether we have yet achieved a distinctive American culture, that indefinable but very real something which could differentiate us from other peoples as definitely as a Frenchman is differentiated from an Italian or a Hollander from a Swede. Nor has that "something" yet fully developed its characteristic symbols or forms of expression in our language, literature, art, music, or philosophy.

It was the endeavor to transplant a traditional culture which brought American education into being. Fearful lest their children should be cut off in the wilderness from the classical past which Englishmen of the seventeenth century had inherited through the Renaissance and the universities of the Middle Ages, and left without a learned ministry and magistracy, the fathers of Massachusetts Bay modeled Harvard on the pattern of Emmanuel College at Cambridge from which so many of their number had come. The goal and pattern thus established has continued as a dominant but gradually receding ideal in the liberal colleges of America for two centuries and more. In the light

of today the idea of transplanting a traditional culture to American soil has not precisely failed but has progressively gone to seed, leaving our liberal education in unmistakable need of a redefining of its function and reorienting of its goals.

Meanwhile American life has shown signs of evolving a vigorous cultural pattern of its own. Turning away from the older pattern with its aristocratic detachment from the world of work, we have been fashioning an indigenous culture out of the very needs, strivings, and aspirations of our contemporary technological civilization. This culture of ours has not yet fully developed its characteristic symbolic forms, but we find hints of them in our functional architecture, in the eye-satisfying catenary cable and structural tracery of a modern suspension bridge, in the sleek streamlining of our more advanced air, land, and water craft, and in a thousand other familiar ways. Why should these characteristic expressions of our times be thought less significant culturally than the classical column and dome or the Gothic vaulting and buttresses of past ages that were limited to a structural art which employed only compression members? Why should the American Society of Mechanical Engineers in our day be thought a less worthy medium of cultural expression than Hans Sachs and the guild of shoemakers in the Nuremberg of *die Meistersinger*?

This is, of course, a bridge to be built between the domain of technology and the domain of culture. Technology is impersonal, material, logical, and economic, whereas culture is human, spiritual, imaginative, and above all money reckoning. Technology has to do with means, culture with meanings. Technology speaks in a technical vocabulary, culture in a universal language of symbolism. What education needs is not a divorce but a bridge between the two. The ideal span may be likened to a cantilever, to be built outward from both sides, member by member. In order that the two converging sections may make a perfect juncture it is important for the engineer to know the meaning of literary and art forms, but it is just as important that the man of art or letters should know the fundamental meanings of technology. To interpret them in terms that all may understand should be one of the major cultural contributions of the engineers of our generation. One does not gain these ends by isolating either cultural or technological education.

A decade ago many educators thought that the sequestering of professional training at the graduate level was a closed issue. Now they are not so sure of it. Even doctors and lawyers are questioning whether they may not have gone too far in dissociating general from functional studies and in imposing time demands which prompted Stephen Leacock's ironic observation that "education is eating up life." And then there is the irrepressible Mr. Hutchins, who sees himself as the savior of liberal education and not as the destroyer of its temples. He sees liberal education being squeezed into extinction between the stretch-out in the secondary school and insatiable time demands of the graduate professional school. He proposes to save liberal education by saving time, that is by squeezing what he calls "the water, waste, and frivolity" out of the final years of high school and the early years of college, where we Americans now indulge our pet propensity for artificially prolonging adolescence. If Mr. Hutchins and other educators generally can do what he thinks he can do under this plan and give convincing proof of it, many engineering educators would be inclined to go along with him. Most of them, however, remain skeptical — the incurable Philistines, no doubt!

Enlightened engineering educators would like to do their part, too, to save liberal education; while they are interested in saving time, their greater concern is to save culture from isolation. They would destroy rather than erect barriers between the humanities, the sciences, and the technologies. They are convinced that life cannot be lived in any such artificial compartments. Occupation and citizenship, competence and culture, professional integrity and ethical sensitiveness, technical skill and human understanding are all strands in what should be the inextricable warp and woof of an

engineer's daily life. This group is therefore not apologetic but outspoken, even militant, in its advocacy of a unified humanistic-social and scientific-technological curriculum.

They grow more convinced that this general type of education deserves to be extended beyond the present limits of engineering education. What confirms them in this conviction is the observation that there are apparently two modal types of young people and that somewhat different modes of education are needed to serve them best. To state it simply, one group includes those whose career goals come into focus relatively early in adolescence, and the other those whose career goals come into focus relatively late.

It would need a psychologist of the Terman magnitude to put this hypothesis to a full test and to classify young people in the two general groups, rather than a mere engineer. General observation would lead the author to believe, however, that most young people who are drawn naturally to scientific careers fall in the first category, while many who are drawn to careers based on human relations and the social services fall naturally into the second category. There seems to be some warrant also for the belief that the peak of individual productivity in a scientific career comes earlier in life than the peak of philosophic wisdom or practical capacity for dealing with human relations and affairs. The truths of science, while sometimes difficult to grasp conceptually or express mathematically, are after all fairly definite and explicit, while almost every aspect of truth having to do with human nature and society is shrouded by conflicting evidence and clashing values. If these ideas are true, there may be sound warrant for beginning career-directed education in the sciences at an earlier age than in the realms of human service and relationships.

At any rate, we in the technological institutions know that we have to do with young people whose career goals have come into focus early and who are strongly motivated by this fact. From every available indication, they are equally worthy in character and equally gifted in endowment with the best of our youth. They are ready to give to their education an intensity of effort substantially beyond that commonly prevailing in college circles. They are quite willing to give a substantial part of their time and effort to studies of a most general character — language, literature, history, economics, geography, psychology, government, music, and art — provided the strongly motivating career interest is not denied its natural and proper outlet. Not infrequently interest in the general stem of the curriculum grows with increasing maturity, as the student's desire unfolds to see technological activity in its setting of human and social significance. It is not uncommon for seniors to give time and effort more willingly than freshmen to matters of social and cultural interest.

In the author's opinion much of the complaint voiced by teachers of English and history drawn from arts faculties over their experience with engineering students arises from the fact that these teachers take for granted that all students taking their subjects are supposed to be premotivated. Their complaints often reveal an unwillingness to employ the arts of salesmanship or to relate the subject in a functional manner to the student's major field of interest. Teachers of humanistic subjects in technological institutions usually have little difficulty from this source; either they accept their students' major interests and seek to build upon them or transfer to other institutions. Once adjusted, they find the high general level of application throughout an entire class a fair compensation for the absence of the occasional brilliant student planning to major in the subject, who is so often a saving remnant in the liberal arts.

There are, of course, those who insist that this sort of thing is not education at all. Quite often these are the people who also insist on an exclusive right to make their own definitions, like a recent protagonist who wrote:

> For myself, I do not see what else can educate a man but the liberal arts. He can be trained, he can be professionalized, he can be specialized, he can be individualized and he

can be contemporized, but he cannot be educated unless he is educated in the liberal arts.

This, of course, is simply question-begging rhetoric. One prefers the forthright dictum of Mr. Hutchins:

> An educational system which does not make the questions of what is ultimately good and bad in human life the center of its attention is not an educational system at all. It is a large-scale housing venture.

If all who choose to link their education to their chosen work have missed the very essence of education entirely, let us be content to take the substance and let the shadow of definition go.

We sin against youth when we keep them so long in college that education — to return to Leacock's phrase — eats up life. No one wants to return to the good old days, to quote Leacock further, "when two years in a saw mill and two in a medical school made men doctors, or one in a saw mill and one in divinity fitted them for the church," but plain sense tells us that the times are out of joint when young people in their thirties are just beginning their active professional careers. When we insist that young folk must be so sure they are ready before they can begin, we make it almost certain that they will be permanently out of the habit of taking the elemental risks of life and have lost much of the self-reliance from which pioneer fathers literally hewed the structure of a new society. If we are to be pioneers again, in this altered world, we must bring young people to grips with life in its risk-taking years. Perhaps it is here that Russia, with its more robust naturalism, may outdistance us. It is sheer romance to expect youth by the millions to spend an artificially lengthened adolescence in an ivory tower and not turn serious attention to career preparation until the A.B. has been won, presumably at the age of twenty-two.

We sin against youth when we undertake to separate culture from skill of hand and make it a mere matter of erudition. The result is all too often a feeble dilettantism or a sterile scholasticism. You get too many people who know the patter of the art world or the music world or the theater, but who do not paint pictures or compose music or produce plays. You get too many arid monographs on the historical or critical minutiae of literature and too little writing of poetry or drama or biography or fiction. Too often this is miscalled *culture*, a self-righteous word which well-rounded people are inclined to avoid. In the great creative epochs of the past there was no such separation of culture from work.

Consider, for example, the incomparable flowering of art in the relatively minor city of Florence, which at the climax of the Renaissance seems to have had a population about equal to that of our Ohio city of Canton. Yet what a galaxy of Florentine names clusters around this year of 1500 — the Lippis, the della Robbias, Raphael, Botticelli, Ghirlandaio, del Sarto, Donatello, Ghiberti, Verrocchio, Brunelleschi, Perugino, and not forgetting Michelangelo and da Vinci, who were too great for even Florence to contain. Look up their stories and you will find that every lad of them went to work in his teens as an apprentice in the shop of a craftsman or the studio of an artist. They were creators first and became scholars only because they were creators. The illusion that the graduate school with its microscopic scholarship is the matrix of culture is something we borrowed from the Germans and are finding it hard to forget.

No one questions that we need an elite of scholarship, morals, and culture as much as religion needs a professional ministry and politics its nucleus of career men and women, but to assert that the selection and formation of any such elite caste should be the main preoccupation of higher education for the millions seems strangely lacking in proportion and perspective. For most of our youth moral values are not something to be learned in the abstract, or for philosophers in ivory towers to spin out like spider webs in filaments of pure thought. Our youth hammer out their moral values in the crude forge of human experience. That is not to say that eternal principles of right, truth, justice, and compassion are not embodied in the

very core of the universe, or that they are not recorded in the hallowed literature of the ages, or that they are not incarnated in sublime or even divine personalities. The gold is there, all right, but it gets hammered into the coin of human relations the hard way by trial and error.

Indoctrination has its place, but it does not solve many moral problems in the concrete. We all know that love is good and hate is evil, but our problem is how to love our enemies when our sense of decency and fair play is revolted. We all know that war is an abomination and peace a boon above price, but our problem is how to preserve for ourselves and guarantee to our grandchildren a decent way of living with gangsters loose in the world. We all know that greed is hateful and the golden rule a moral imperative, but our problem is to get enough for ourselves to live up to our inborn capacities while making it possible for all other men to do the same. We all know that the moral crisis of our times is to make the material means of living the servants of great ends and not the masters of mankind, or possibly a Frankenstein monster. The author remembers hearing the venerable Master of Oriel College in between-wars England lamenting that "it was no longer possible for a few men to be idle in order that many men may be good." Of course we need philosophers and critics and seers to contemplate and examine and feel these issues profoundly, but for one of these we need a thousand men and women of good will and intelligence who will forge moral values out of the very heat of the struggle to raise food, produce goods, sell merchandise, build houses, cure the sick, raise families, run homes, teach school, and make communities clean and decent.

Scholarship which isolates itself from life is all too likely to lose its way in moral detachment. The futility of the learned world in the universal crisis of the last decade, the apparent result of carrying over into the humanistic realm the moral neutrality of the physical sciences, has been all too sadly apparent. If we must choose between the healthy realism of men at daily grips with the world of work and the bloodless, critical cynicism of the intellectuals of the 1930's in the crisis of moral nihilism, the choice seems clear. The standards of moral integrity set and upheld in the professions must be counted among the most effective moral anchors of our times.

As a final item in this confession of educational sins against youth, give thought for a moment to widespread illusion that freedom is a natural birthright. The American people are not too happy about what the war disclosed concerning the rearing and education of our youth. Granting the military standards were set high, it was a shock to find a third of our young men unfit physically, mentally, or emotionally for the armed forces and that war service had so little pull on young women apart from glamorized uniforms and romantic jobs. For all our boasting, freedom has obviously not worked too well. This clearly is a major factor in the demand of our armed forces for a system of universal military training, as yet unsupported by any evidence of its military effectiveness.

However we do it, education must have goals of discipline as well as freedom. Seemingly different, the two are really one. One of the most suggestive verses in the Bible is this: "If a man compel thee to go one mile go with him twain." This text is obviously a counsel of perfection, foolish if taken literally, but emphasizing a profound truth by its apparent denial of common sense. What it means is that many of life's experiences begin with a mile of compulsion, but that its true freedom and durable rewards are to be won only in the mile of voluntary striving which lies beyond. In the first mile men must work to live; in the second they work to maintain their sense of dignity and worth. In the first mile they seek tangible rewards; in the second they strive for enduring satisfactions. In the first mile men seek pleasure; in the second, they discover happiness. The first mile is the mile of discipline; the second is the mile of freedom.

Real freedom is not a birthright, it is something you have to win the hard way. Perhaps you can sit down at the piano and pick out the classic *Chopsticks* by hit and skip, but you can't sit down

like Artur Rubenstein with the Philharmonic and thunder out the *Emperor Concerto*. Even in my sixties I might step onto the pitcher's mound and get the ball somewhere near waist high and perhaps over the plate, but I couldn't put the fire on it like Bob Feller and strike out the best batters in the league. The simple truth is that Artur Rubenstein and Bob Feller have a freedom that you and I do not possess. Born that way? Each has his natural gift, but each has had to earn his freedom by a relentless discipline of study and practice. He has to work to keep it, too. The great Paderewski, whose genius at the piano used to move thousands to ecstasies, once said, "If I neglect my practice for one week, I know it; if I neglect it for two weeks, my audience knows it."

No man's education is even well begun until he can do some one thing extremely well. It does not matter so much what — type a letter, bake a pie, weld a seam, paint a house, do a portrait, beat a drum, compose a symphony, operate a radar, or design a Boulder Dam. What counts is the self-mastery that enables a man to look the world in the eye with a steady self-assurance.

The adequacy of any educational plan or system must be weighed in the scale of citizenship, no less than that of personal self-mastery, of career fitness, of cultural orientation, and of social and group morality. Engineers and scientists have had their share in the universal searching of educational consciences over our failure as a people before Pearl Harbor to discern the course of world affairs, to appraise aright the issues implicit in totalitarianism, to foresee the impending collapse of political and economic colonialism, and to get the problems of race and color into true perspective. They share the common concern of the hour to find the middle path of wisdom in our domestic economy between the extremes of individualism and parasitism, and are acutely conscious of the new issues arising out of long-range aerial missiles in combination with atomic and bacterial weapons of unimaginable potency.

As all reasonable men recognize, these shortcomings have been universal. The products of our most liberal disciplines have been no more proof against them than those of our most technical disciplines, nor are the measures taken or proposed by our technologists for world security and cooperation overshadowed by any offered by the purest of our humanistic thinkers. At the moment, dearth of topgrade civilian talent in government, particularly in the realm of international relations for which we naturally look to the liberal arm of education, has made it necessary to turn to military leaders whose fundamental training has been highly functional if not severely technical. The score on these counts is certainly not less than even, and not too creditable to either major wing of our educational system.

Citizenship for most men has its center much nearer home. Only half of it lies in the realm of politics and public agencies. Fully half lies in the domain of voluntary, self-constituted institutions — the chambers of commerce, citizens' leagues, community funds, welfare federations, community foundations, labor federations, social settlements, hospitals, museums, churches, symphony orchestras, community theaters, the Y's, the boy and girl scouts, the parent-teacher associations and the like, with which our civic life abounds. The role of the technologist in party politics is likely to be a secondary one and his role in public agencies is likely to be largely technical or administrative. His citizenship apart from election-day duties, will naturally find its most active expression in the voluntary institutions of community life. Here the standard to be met cannot possibly be less than full participation on a par with any other educated and professional group.

A similar standard applies to the engineer's individual participation in cultural life. His is a sustaining rather than a creating role. No one expects the engineer to write the books, compose the symphonies, create the dramas, paint the pictures, or formulate the philosophies in which an emerging American culture will find its symbolic expression, nor can we expect him to take a major part in shaping public standards of appreciation and criticism. It is extremely important, of course,

that these things should be done, but it needs only a small elite among the educated population to do them. If engineers are counted in full proportions, when compared with any other educated groups, among those who read sound books, see good plays performed, attend the best musical events, frequent art exhibitions, give ear and voice to the best ideas being discussed, and pursue artistic hobbies — and to a surprising degree they are — the hackneyed and threadbare charge of being a Philistine will soon be forgotten.

The author has thought it worth while to write at length of these general attributes, as exemplified in the integral plan of education pursued by engineers, because he believes that they, rather than the traditional forms of the college of arts, form a general pattern for the greatly expanded system of higher education in America now in prospect. With over two million of our young people already in college and an increase to three million or more within a decade being confidently predicted, growth both in the size and number of our higher institutions seems clearly inevitable. What direction shall it take? Today we have about 22.5 percent of all our young people in college and if predictions come true we shall have 35 percent within a decade. In our present economy only about one actively employed person in sixteen is engaged in what the census classifies as a profession. An annual recruitment of between 100,000 and 125,000 would be ample to sustain our present professional numbers and a very modest addition will supply all needed gains. Where are the rest to go? Obviously into the general activities of business, industry, agriculture, and home-making and into various semiprofessional service occupations now multiplying on every hand.

The historic aims and patterns of the arts colleges still have their place in this emerging picture. The intellectual and cultural world will still need a professional and amateur elite; there will still be young people needing a longer period of exploratory education to bring their career interests to a focus; there will still be the stratified plan of training for certain professions; there will still be the families of comfortable means who crave for their young people a chance to finish off adolescence in an enriched and not too strenuous institutional life; but it is hard to figure these aims as a widely prevailing norm of higher education.

Against these traditional patterns, let us set up for comparison a type of education which has the following characteristics:

1. It is functionally related to a fairly broad area of economic activity.

2. It is integral in structure, with continuous bands of general humanistic studies, foundation studies, and more highly functional or technical studies running lengthwise throughout the curriculum.

3. It is of individually adjustable length, running through the entire range of undergraduate and postgraduate study.

4. It provides for progressively increasing specialization, beginning with little or none and dividing by successive steps into branches which cover broad area occupations (e.g., mechanical engineering), then specific professions or occupations (e.g., automotive engineering), then advanced specialties within such occupations (e.g., jet motor propulsion).

5. It shares the ethical standards and intellectual traditions of a great professional body.

6. It is highly motivated throughout, is strong in disciplinary features, calls for considerable intensity of application, and affords sufficient scope for both individual discipleship and independent effort.

There need be no pretense that all the general attributes discussed above or all the more specific characteristics just enumerated are fully exemplified in all engineering curricula in all institutions. The range from the best to the worst is very wide. It can be said, however, that the ideal so expressed is being increasingly realized, especially in the interrelation of humanistic, scientific, and technical studies. A great impetus was given by two notable reports of the Society for the Promotion of Engineering Education (now the American Society for Engineering Education), one entitled "The

Aims and Scope of Engineering Curricula" which appeared in 1940 and the second entitled "Engineering Education after the War" which was published in 1944.

These reports strongly advocated a broadening of the base of engineering education, with roots extended more deeply into the social sciences and humanities as well as into the physical sciences in order to sustain a rounded educational growth which will continue into professional life. To this end the development of the curriculum in parallel *scientific-technological* and *humanistic-social* stem was advocated, with each stem organized in an articulated sequence of subject matter and disciplines to lead to definite educational objectives. It was proposed that the scientific-technological studies should be directed toward:

1. Mastery of the fundamental scientific principles and a command of the basic knowledge underlying the branch of engineering the student is pursuing. This implies: (*a*) grasp of the meaning of physical and mathematical laws, and knowledge of how they were evolved and of the limitations of their use; (*b*) knowledge of materials, machines and structures.

2. Thorough understanding of the engineering method and elementary competence in its application. This requires: (*a*) comprehension of the interacting elements in situations which are to be analyzed; (*b*) ability to think straight in the application of fundamental principles to new problems; (*c*) reasonable skill in making approximations, and in choosing the type of approach in the light of the accuracy required and the time available for the solution — in sum, a foundation for engineering judgment; (*d*) resourcefulness and originality in devising means to an end; (*e*) understanding of the element of cost in engineering and the ability to deal with this factor just as competently as with technological factors.

3. Ability to select the significant results of an engineering study and to present them clearly and concisely by verbal and graphic means.

4. Stimulation of a continuing interest in further professional development.

It was further proposed that the sequence of humanistic-social studies should direct toward:

1. Understanding of the evolution of the social organization within which we live and of the influence of science and engineering on its development.

2. Ability to recognize and to make a critical analysis of a problem involving social and economic elements, to arrive at an intelligent opinion about it, and to read with discrimination and purpose toward these ends.

3. Ability to organize thoughts logically and to express them lucidly and convincingly in oral and written English.

4. Acquaintance with some of the great masterpieces of literature and an understanding of their setting in and influence upon civilization.

5. The development of moral, ethical, and social concepts essential to a satisfying personal philosophy, to a career consistent with the public welfare, and to a sound professional attitude.

6. Attainment of an interest and pleasure in these pursuits and thus of an inspiration to continued study.

Like all worthy educational goals, these statements substantially overtop present levels of attainment. However, progress toward their attainment has been steady and consistent. Implicit in the entire program is the idea that undergraduate training is essentially of a foundation character — what industry calls a blanking-out operation — and that the major goals of specific professional training lie chiefly in the years beyond. While designedly functional, the program outlined above is in no sense a narrow technical training. What it aims to do is to give a sound command of the basic knowledge and method which have led to extraordinary progress in one of the major sectors of human endeavor, in a setting of social significance and ethical responsibility. It would be a relatively simple operation to delete all specific references to engineering and to matters peculiar to it, and to substitute terms relating to other distinctive social functions.

The architects of this plan had in view only the

aims and scope of engineering education, yet their drafting may have been on broader lines than they knew. There is much in both the letter and the spirit of their pronouncement which is reminiscent of the goals visualized exactly one hundred years ago by B. Franklin Greene, who reorganized the historic Rensselaer School which Amos Eaton had established in Troy into the Rensselaer Polytechnic Institute, prototype of our engineering schools of today. Without doubt Greene was the first man in America to submit the problems of education for the scientific and technical professions to thorough investigation and analysis. In essential matters his conclusions remain valid today. What he visualized was "an educational discipline complete in itself, not narrowly vocational, but adapted to the complete realization of true educational culture." Prophetic words! In the author's opinion, to repeat an earlier statement, if the great expansion of higher education predicted for the next decade is actually realized, it seems likely that much more of it will follow the mode established in engineering, at least in its general plan and outline, than the older traditions of the liberal arts.

The First Course in Psychology: The Psychology of Persons

BY SISTER ANNETTE WALTERS

THE FIRST course in psychology should be, I believe, the Psychology of Persons, and not the traditional course in General Psychology. Such an introduction to psychology makes sense to the student, is philosophically sound, and is at the same time in harmony with the most progressive trends in modern psychology.

I. THE PLACE OF PSYCHOLOGY IN GENERAL EDUCATION

To understand the psychology of the person, it is necessary to integrate the philosophical and the scientific study of man, an approach which has not been very popular with psychologists.

In the late nineteenth century, Ebbinghaus, in declaring that "psychology has had a long past but only a short history," implied that philosophical studies of human beings were of little value; only the experimental, "scientific" approach could yield valid knowledge. Similarly today, many psychologists, in accepting a positivistic philosophy, teach their subject from a purely "scientific" angle and ignore its philosophical foundations. This they can do without objectively violating the truth about man because of the wealth of scientific data at their disposal, the truth and significance of which can scarcely be questioned by any unprejudiced observer. But the interpretation of these facts in their relation to the whole of life is colored considerably by the personal philosophy of the teacher. This is true even when the teacher emphatically denies that philosophy has any truth to contribute to the understanding of man. The very denial of a philosophy is, needless to say, an expression of one.

This view, namely, that philosophy (and theology, too, for that matter) can give us no valid knowledge of human beings, is diametrically opposed to the Christian tradition upon which Western civilization has been built. It is contrary to the view of knowledge and of man presented in the "great" books commonly read by students as a part of their general education — the Old and New Testaments, Shakespeare, Chaucer, Dante, the poetry of Donne and Blake, and the Declaration of Independence, for example — and is at variance with the basic principles taught in Christian ethics and religion classes. It sets up a false dichotomy between philosophy and science and prevents the student from realizing that *all truth is basically one.*

If the purpose of general education is to enable students to see life as "all of a piece," and if psychology has a legitimate place in the program of general education, then the philosophical assumptions that underlie psychology must be taught explicitly and in the light of their applications to personal and social problems. They must be so taught that students see the place of man in the universe and are able to apply this knowledge to everyday life, to the interpretation of human motives and moral responsibility, and to social betterment.

The place that psychology will have in the program of general education rests upon the instructor's definition of psychology. I am defining it as the study of the person, or as the philosophy and

science of man. This definition is broad enough to include man's essential nature as well as the behavior that proceeds from this nature. The subject matter of psychology, according to this definition, is not just "behavior," but human nature in its entirety — man as a biological organism, man as a social animal, and man as a person. Thus, psychology is at once a natural science, a social science, one of the humanities, and a philosophical discipline. Viewed in this light, it is one of the great integrating subjects of the college curriculum, since in its study of human beings, it transcends all divisional boundaries. Rightly taught, it can help students more than any other subject, except religion, to apprehend all aspects of reality in their essential relationships. Narrowly conceived, it can destroy all unity in the curriculum, and produce in the student a skeptical or cynical attitude toward all truth; it can frustrate any attempt "to build up a solid core, really and fully human."

II. SPECIAL PROBLEMS OF THE BEGINNING COURSE

A. The first course in psychology is at once a part of general education and a preprofessional course. In most colleges, the introductory course in psychology must provide simultaneously for three classes of students:

1. Those who will later specialize in psychology.
2. Those who will later specialize in a profession for which psychology is a prerequisite, such as teaching, medicine, social work, nursing, business and the like.
3. Those who do not plan to use psychology professionally but who want to know what psychology is and how it can be used in everyday life.

As a first step in constructing a course to meet the needs of all three groups, I have tried to analyze the needs of each group separately.

Group 1. The student who will later specialize in psychology must master, in the introductory course, the content needed to understand the work of advanced courses. He must also become competent in using the scientific method. He must understand the logic of science, and must know how to determine the validity of clinical data. In addition, he must become aware of the philosophical assumptions that underlie the study of psychology. The first course should provide him with the framework for organizing his entire study of psychology.

Group 2. These students often take only the introductory course. What they learn about people (outside of literature, science, religion, and philosophy classes) must be learned in the beginning psychology course. They need a dynamic psychology which will prepare them to understand human motivation in all areas of life. Their study must be directed toward practical applications. They, like the students in Group 1, can profit from a study of philosophical assumptions, scientific method, and the logic of science. But their preparation in these respects need not be as intensive as it must be for prospective psychologists.

Group 3. These students need, in common with Groups 1 and 2, the ability to use psychology in their everyday contacts with people, to become intelligent consumers of psychological services, and to see psychology in relation to the rest of the liberal arts curriculum and to life. For all of these ends, a knowledge of basic subject matter is required, together with an understanding of the logic of science, the fields of application of the scientific and clinical methods, and the philosophical assumptions underlying the study of psychology.

Because the needs of all three groups overlap considerably, I believe that they can all be met in the same introductory course. A special course for prospective majors in psychology is not necessary, provided the teachers of advanced courses base their instruction upon the students' background.

B. The typical college sophomore has had only limited experience with people. Many college students have never been away from home before coming to college. Their knowledge of people is limited to one social class and to one community,

the mores and standards of which they accept uncritically. Kinds of human behavior, indifferent in themselves, are endowed with the attributes of moral or immoral conduct, and the student's prejudices prevent him from accepting people different from himself. Such one-sidedness of view and narrowness of mind are the greatest obstacles to the understanding of human nature. In studying human beings there is no substitute for an open mind and for direct experience with different kinds of people in different cultural milieus. Without such experience, the student's knowledge of psychology remains purely "verbal"; he may learn the facts of psychology, master its vocabulary, and yet have no real understanding of people.

Some truths about human beings, of course, cannot be grasped by the college sophomore because of his youth and inexperience. It is a moot question whether teaching can in any way accelerate the inner processes of maturation. My own experience leads me to believe that, with some students, at least, it can.

C. Textbook writers fail to clarify the philosophical assumptions upon which their writing is based. The problem of integrating psychology with the rest of the liberal arts curriculum is a crucial one in the Christian college. The typical textbook writer either is not a Christian or else assumes that his religion is one thing and psychology another, and that there is no connection between the two. The teacher who uses such texts (and must, because there are no other books equally readable or sound scientifically), must somehow help his students to bridge the gap between what they are learning about man's nature in other classes, and what is assumed in the psychology book.

This problem is significant, I think, not merely as an issue in the teaching of psychology, but as the basic problem of all general education. If the student is to acquire, as a result of general education, a consistent picture of life as a whole, he must at some time come to terms with such basic philosophical concepts as (1) the nature of truth, and (2) the nature of man and his place in the universe. All courses in general education throw some light upon these concepts. In a few instances, at least, it has been the study of psychology, and psychology alone, which has prevented the student from acquiring a consistent theory of knowledge and a satisfactory concept of man. This fact, I believe, is not the fault of psychology as such, but of the way in which it is taught.

Textbook writers (and psychologists in general) differ greatly in their opinions as to what constitutes the nature and scope of psychological study. Yet a scrutiny of textbook definitions of psychology reveals a common thread running through most of them. For most writers, psychology is in some way or other the study of behavior. It may be the "scientific study of behavior," the "scientific and clinical study of behavior," or the study of the "development of behavior." But in any event, it is limited to the study of observable realities or phenomena. As such, its subject matter comes under the head of natural science and can therefore be investigated by scientific techniques alone.

Such a definition of psychology I reject, not because it is totally false, but because it is only a partial truth, which, out of its setting, produces a caricature rather than a true picture of the human person. The limitation of psychological study to what is observable, rules out the possibility of ever understanding man's essential nature. As a result, the psychologist forces his students to go elsewhere for an answer to the question, "What is man?" The psychologist who accepts these limitations of subject matter and of method must not be surprised if his students, particularly his women students, prefer to study human nature, not in his classes, but in literature, philosophy, and humanities classes. Nor should he be surprised if his more mature students, like William James, conclude that "psychology is a nasty little science," and that "the real problems are in philosophy."

The science of psychology must come to terms not only with philosophy, but also with religion. The real issue is not, of course, science versus philosophy, or science versus divine revelation, but one of integrating into a consistent whole the

truths derived from each of these sources of knowledge. So far as I know, the Christian college alone is attempting such a synthesis.[1]

Compared with the works of artists and novelists, spiritual writers, theologians, and philosophers, the writings of experimental psychologists have been singularly sterile in throwing light upon people as such. Yet the study of scientific psychology, when correlated with other approaches to the study of man, is tremendously important for an understanding of people. Among the many source materials from which one can derive valid generalizations about human personality, are several which are not often used by professional psychologists. Some of these resources are experimental; some have been derived from psychological and psychiatric clinics. Others are found in the researches of anthropologists and sociologists, the creative work of artists, musicians, and novelists, the speculative researches of theologians and philosophers, the diaries, letters, and autobiographies which people have written throughout the ages. Unfortunately, specialization in psychology sometimes results in a mental myopia which prevents the psychologist from viewing human beings or teaching human nature from any but his own particular methods of inquiry. He thus becomes "provincial" in mind, and is wedded, not to the study of people, but to the pursuit of a single method of study or to the partisan defense of a "school" of psychology. Teaching of this kind, valuable as it may be for the advanced student, or in the graduate school, has no legitimate place in the program of general education.

A related problem of the first course is that of reconciling the objective analysis of human motivation, characteristic of psychological study, with moral evaluations of human conduct. Typically, psychology textbooks for beginning classes either ignore the moral point of view or disparage it as a relic of a prescientific age.

D. Special needs of women students. It is heresy in many psychological circles, to suggest that men and women differ in their educational needs. Historically, the studies of Thorndike, Terman, and others, showing as they did that men and women do not differ on the average in intelligence, are supposed to have clinched the argument once and for all. But have they?

American women today occupy an ambiguous place in our culture. They have achieved most of the freedom which an earlier generation of feminists fought to secure for them. Probably nowhere in the world do women suffer from fewer limitations than they do in our country. Yet, if we can trust the few research studies at our disposal and the accumulating popular literature on the subject, women are not correspondingly happy. According to Margaret Mead, ". . . the most articulate, the best-educated, the most mobile group of American women is disturbed. . . . The position of women in America at present is explosive and potentially harmful."[2] Similarly, Foster, after making an exhaustive study of 100 women graduates, found that, "Both in range and frequency there were more problems after graduation from college than at any time before," and that,

> . . . for this group of women coming from a high socio-economic level, attending the best colleges and universities in the country, and achieving an academic standing above average, there is far too little correlation between what they learned in college and the situations of everyday life which they faced after leaving college. Whatever role college played in their lives, it did not give them better preparation for

[1] This synthesis, I believe, is the most significant contribution of the Christian college to the cultural life of America. In the words of Christopher Dawson:
"It [Christianity] seeks not the destruction or the negation of nature, but its spiritualization and its incorporation into a higher order of reality. Consequently, the organization of the material world by science and law which has been the characteristic task of modern European culture is in no sense alien to the genius of Christianity. For the progressive intellectualization of the material world which is the work of European science, is analogous and complementary to the progressive spiritualization of human nature which is the function of the Christian religion. The future of humanity depends on the harmony and coordination of these two processes." — Christopher Dawson, *Progress and Religion*, (New York: Sheed and Ward, 1938).

[2] Margaret Mead, "What Women Want," *Fortune*, December, 1946, pp. 173 and 224.

meeting the inevitable and predictable problems which most women encounter.[3]

The problems reported by these women were, in order of frequency: personality, finances, health, husband-wife, relations with associates, recreation, housekeeping, relations with relatives, parent-child, crisis, in-law, sex, religion, vocation, and education. Such problems present a challenge to all teachers of college women, but particularly to the teacher of the first course in psychology, the content of which has a direct bearing on at least half of the above problems.

From a professional standpoint, too, women's interests are, on the average, different from those of men. According to Terman and Miles,[4] women tend, even in our culture, to be more interested than men in "administrative occupations for young, helpless, and distressed." It is reasonable to suppose then, that potential "career" women as well as homemakers can profit from the study of human personality and of the factors which influence its development.

III. A DESCRIPTION OF THE FIRST COURSE IN PSYCHOLOGY AT ST. CATHERINE'S

A. Purpose and content. The first course in psychology, the Psychology of Persons, aims to create a synthesis of knowledge within the intellectual grasp of college sophomores. It was planned for women students and has been revised over a period of five years in the light of our research studies on the needs of Catholic women students, both before and after graduation from college.

The course is primarily scientific in nature. It stresses particularly those aspects of psychology about which there is adequate scientific evidence to warrant generalizations. It aims, among other things, to command respect for careful scientific research. It points to the need for a critical attitude and for suspending judgment on a problem until all the facts are available. Yet it also stresses the fact that philosophy and divine revelation as well as science give us valuable insights into people. The main objective of the course is that of understanding the *individual human being* rather than the generalized human mind. To accomplish this aim, it takes its subject matter from any legitimate source of knowledge that is relevant, whether such knowledge be attained through revelation, reason, or scientific experimentation.

The subject matter of the course is the nature of man and the development of his personality throughout the entire life cycle. Its major objectives are: (1) an understanding of the nature of man and his place in the universe; and (2) an understanding of all of the factors which, in the course of an individual life, influence personality development. It is a three-quarter course, meeting three hours a week, and is organized under eight major headings,[5] as follows:

I. The Systematic Study of Personality.
II. The Psychology of Infancy and Early Childhood.
III. The Psychology of the School Child.
IV. The Atypical Child.
V. The Psychology of Pubescence and Adolescence.
VI. Personality and Human Adjustment.
VII. The Psychology of Maturity and Old Age.
VIII. Theoretical Considerations.

Throughout the course, I have tried to integrate psychological research with data from other sciences which deal with man, notably: biology, sociology, anthropology, education, and medicine. This involves a discussion of the personal, sociological, and educational implications of the factors which influence personality growth. The whole personality rather than isolated mental functions receives emphasis in the discussion of each stage of growth. I avoid a discrete treatment of "social development," "motor development," "sensory development" and the like as much as possible. Instead, I try to center attention at every moment upon the human being himself at a given age level, rather than upon any one of his mental functions. This treatment should highlight the fact that "sensation," "perception," "emotion" and other mental functions are only aspects of the total per-

[3] R. G. Foster, "Education and Women's Needs," *The Educational Record*, XXIII (1942), 108 and 115.

[4] L. M. Terman and C. C. Miles, *Sex and Personality* (New York: McGraw-Hill Book Co., 1936).

[5] A complete course outline will be mailed upon request.

sonality. It is unfortunately possible to know a great deal about mental functions in isolation and still have little understanding of the human being himself.

In Part I, "The Systematic Study of Personality," the foundation is laid for the synthesis mentioned at the beginning of this article. Under this head we take up such problems as: (1) the definition of psychology; (2) points of view in psychology; (3) the relation of psychology to other branches of knowledge and to other professions; (4) sources of knowledge concerning human beings; (5) the oneness of truth derived from science, philosophy, and revelation; (6) the nature of man — dualism and monism; freedom of choice and the doctrines of physical, biological, and psychological determinism; and, (7) methods of studying personality. Throughout the year, the concepts developed in this unit are applied to the solution of human problems. Recently, for example, a group of students became interested in the subject of psychosomatic medicine. As a result of this interest, they read, at my suggestion, Carl Binger, "The Meaning of Psychosomatic Medicine," in *The American Scholar*, November, 1946. This subject is naturally interesting even to the least philosophically minded student. Students were led to see the relevance of philosophy to the most urgent of human problems by such questions as: What mind-body relationship does Binger assume? Is he a materialist, idealist, or realist? If you accept Binger's postulates, can you also hold that man has any freedom of choice? After a heated discussion of the above questions, a number of students remarked that now, for the first time, they really understood why it was important for them to get a liberal education. As one student put it, "My whole philosophy of life has undergone an operation!"

At the end of the course, we review the entire year's work in the light of philosophical principles and the Christian faith. In Part VIII, "Theoretical Considerations," we take up such subjects as: (1) present-day schools of psychology; (2) psychology and the social order; and (3) psychology and life. Under the third heading, the practical applications of the year's study are developed cooperatively by students and teacher.

Although the organization of this course differs radically from that of General Psychology, objective tests given at the end of the year indicate that students have learned as many basic facts of General Psychology as have students in General Psychology classes. Much of the subject matter of General Psychology is taught explicitly in this course, but in a different context from that in which it is usually taught. For example, in teaching a unit on "The Atypical Child," I present several case studies of atypical children — a child with a physical defect, such as spastic paralysis, an emotionally disturbed child, an intellectually retarded child, a child with a school problem, such as a reading disability, and a child suffering from a sensory defect. As often as possible I use closed cases from my own clinical files. Typically, after presenting the case of a child with a neurological injury, I raise the question: What can be done for him? Invariably, students ask such questions as: Will he ever get better? What made him that way? Could his condition have been prevented? Can he be helped to adjust, even if his physical condition does not improve? These questions are then listed on the blackboard, and in a parallel column I list the kinds of information which will probably be needed before the students' questions can be answered. This information may include: (1) the structure and function of the injured part of the body, such as brain and spinal cord, ear, or eye; (2) the possibility that diseased tissue will regenerate; (3) the effect of the injury upon the child's personality; (4) the relation between physical defect and neurosis; (5) how parents can be helped to accept the child's problem; (6) what the parent, teacher, physician, nurse, psychologist, and community can do to help children with such problems. The next step is to teach specifically the information called for, and finally to apply this information to the case under consideration and to answer the question with which we began, *viz.*, What can be done to help this child? With a spe-

cific case in mind, the student's attention is sustained at a high level even during the most technical explanations of subject matter.

Similarly, in discussing the case of an emotionally disturbed child, we inevitably answer the questions: What are emotions? What is their physiological basis? What theories of emotion best account for the facts? To what extent can emotions be educated? What relation is there between emotion and intellect? In this way, we progressively cover most of the subject matter included in General Psychology courses. Since the technical vocabulary of psychology is not stressed for its own sake, however, students taking this course are probably less facile in using the terminology of psychology than are their friends from neighboring colleges. Students often tell me that, in comparing their achievement with that of their friends who take General Psychology in other colleges and universities, their friends "know more terms than we do, but we understand more."

B. Methods of teaching. Methods of teaching include lectures, discussions, directed observation (in the campus preschool, kindergartens, school playgrounds, theaters, youth centers, and occasionally, homes for the aged), demonstrations, films, tests, oral and written reports, and term papers. Usually after Topic I is completed, I present a life history and then invite students to analyze with me the factors which operated to produce such a personality. After that, students present studies of people whom they have known. The ensuing discussion always convinces them that they need to know the content of psychology before they can get very far in their interpretations. At this point, I introduce the subject matter of human growth and development, starting with heredity, prenatal development, and infancy. As often as possible, the class period opens with the presentation of a concrete case, followed by an interpretation, and ends with a systematic summary of principles involved. Since I also teach a course in Clinical Psychology, I often invite the most promising students to observe demonstrations planned for advanced classes — play interviews, play therapy, and testing of children. These observations are made from behind a one-way screen so that the children are not distracted.

The films which I have found most useful for this course are: Gesell, *Life Begins*;[6] Vassar *Series in Child Growth and Development*;[7] Lewin and Lippett, *Experimental Studies in Social Climates of Groups*;[8] and *And So They Live*.[9] Before the film is presented, I teach students what to look for, and after seeing the picture we discuss it. Whenever possible, the film is then shown for a second time.

IV. EVALUATION OF THE COURSE

Many lines of evidence have been used to evaluate the course, but space permits only a brief mention of them here. They include: examinations, questionnaires, observation of behavior, interviews, faculty and student comment and success in advanced courses.

Some typical unedited comments of students (compiled from unsigned questionnaires) are as follows:

I have come to see the effect of education on the person — not just in the light of one subject, but of all subjects in relation to each other.

. . . . .

Psychology seems to always figure in my work and studies. I seem to be always looking at things from a psychological viewpoint.

. . . . .

I was relieved to find that Behaviorism is losing prestige. Several years ago I read some of these books and was disturbed about some of the implications, but couldn't interpret them in any philosophical light.

. . . . .

My ambition to be a teacher has been lifted to a purpose of aiding society rather than merely having a job.

. . . . .

It has furthered a more wholesome view toward the discussion of moral questions. By correlating my religion and psychology courses, I have developed a more Christian view of life.

. . . . .

I can understand the reasons people have for doing things

[6] Encyclopaedia Britannica Films, Inc.
[7] New York University Film Library.
[8] New York University Film Library.
[9] University of Iowa. Department of Visual Education.

that they do, realizing that everyone is different and possesses peculiarities just as I do. I am more tolerant of others.

. . . . .

My interest in state and national affairs has increased since I learned that they are products of human expression of needs through acts.

. . . . .

I have learned that knowledge is the road to truth. The more one knows of truth, the less he is satisfied with knowledge of an inferior sort.

. . . . .

I acquired a knowledge of children which will stick with me because it was acquired through practical experience and was not something I memorized from a book.

. . . . .

It has taught me to get along with my group. It has taught me that I must be unselfish and contribute to the group as a whole.

. . . . .

It has made me dissatisfied with myself — and has forced me to think. I always took things for granted before, or asked someone else to give me the answers.

. . . . .

I have learned that our childhood leaves lasting impressions that we don't and sometimes can't easily dispose of. This has helped me to understand people who used to annoy me.

. . . . .

I learned the value of courtesy.

. . . . .

I learned the practice of getting underneath the surface and not being content with temporary remedies and suggestions which disregard the far-reaching consequences of existing problems.

. . . . .

I have a deeper interest in forms of recreation — their influence on personality.

. . . . .

I have learned to face my problems — not to turn from them. They will only come back bigger and harder to face!

. . . . .

This is the most practical course I have taken so far in college. I believe that for anyone thinking of marriage or any kind of relations with children, this course is a "must."

V. RELATION TO ADVANCED COURSES IN PSYCHOLOGY

Two sources of objective evidence show that students who later major in psychology are not handicapped because this course has been substituted for General Psychology. One of these is the Graduate Record Examination, given in the senior year, the other is success in graduate work.

So far, twelve students, who took this course in their sophomore year, have taken the Graduate Record Examination in psychology during their senior year. The scores of all but one were at average, or above, for first-year graduate students in both eastern and midwestern colleges, and the scores of the most gifted two students were in the upper five percent. The five students who have studied in graduate schools have succeeded in their graduate work.

VI. CONCLUDING REMARKS

Psychology in the future, while remaining a biological and social science, must be more closely united to the humanities than it is at present. Indeed, appreciable progress has already been made in that direction. The psychology of the person, and its relation to human welfare will be achieved not just by science nor by "armchair" philosophy, but by a conscious integration of the two. For the Christian, moreover, the humanistic ideal, toward which the psychology of the person is directed, will make God rather than man the measure of all things. Man's dignity rests, not upon his highly organized nervous system, which makes him king of all the animals, but upon his soul which is made to the image and likeness of God. Christian humanism, rooted in God rather than in man himself, must be the major goal of general education in the Christian college. The significance and value of any course — including psychology — will be commensurate with its contribution to this goal. The psychology course described in this article, has been consciously planned to that end. For with Maritain, I believe that,

> . . . the task which confronts the Christian is the task of saving the humanist truths which four centuries of anthropocentric humanism have disfigured, of saving them at the very moment when culture is decaying and when these truths, together with the errors which distort and oppress them, are threatened with dissolution.[10]

[10] J. Maritain, *True Humanism* (New York: S. Scribner and Sons, 1938).

The Lopsided Harvard Report on General Education

BY WALTER T. FISHER

THE HARVARD report on general education has been treated by educators and other persons more qualified than a lawyer to have a balanced judgment of the report as a whole. This is not a review of the report. It does not deal with its numerous good points. I shall limit myself to one soft spot in the apple — or, rather, what I deem to be its hard, green side which may some day ripen into another valuable report.

Where the report is out of balance, it seems to me, is in treating actual *teaching* like a stepchild: *what to teach* is the favorite, *how to teach it* is slighted.

Neither of the two was the first purpose of the enterprise. As shown by the title of the committee, the report was primarily about the *Objectives* of a General Education in a Free Society. It gives much fruitful attention to these objectives, the end products of education, the intellectual discipline and abilities that an educated man ought to have. It does not stop there, but goes on to the vital matter of how these objectives are to be attained. "By good methods of instruction?" you ask. "Yes, of course," replies the committee, a little impatiently, "but we prefer the familiar faculty game of choosing and rearranging the subject matter of courses." And the committee is soon in full cry after the curriculum, to which a large part of the report is devoted. "We come at last," say the authors, "to the heart of the subject, the curriculum."

The truth is that the curriculum is not *the* heart of the subject. It has two hearts; what to teach — curriculum — is no more important than how to teach it — method.

Of course, there is no sharp boundary between curriculum and method. The historical approach, for example, is both. But the distinction is clear. It is recognized in the report, for example, in referring to algebra and geometry "as now taught" and "if properly taught." And of course the report does not pretend to completeness. It rightly says that "books about education are not competitors." It emphasizes that there is no single method of teaching.

There is, in fact, as I shall show, a great deal about methods of teaching scattered through the volume, most of it excellent as far as it goes. There are many specific suggestions, such as for conferences, discussion, group demonstrations, shop training, and actual work. In science, direct observation and experiment are recommended. There are many suggestions for teaching English, such as reading aloud; and — a broader suggestion — that the books must not be too easy, so that the student must ponder over them and exert some effort in finding what it is all about. There are other broad ideas about method. The weakness is that these things are stated rather than discussed. There is no adequate discussion of their psychological basis nor of their basis in experience, no such large-scale treatment as is given to the objectives of education and their relation to the choice of curriculum. To *teaching* the curriculum the report assigns a subordinate role.

Methods of knowledge (scientific method, for example) are treated with small attention to their

relation to *methods of instruction*. The scientific method is examined and found wanting as a unifying principle, that is, as a means of attaining the vital object of uniting students in a common tradition. It is found, on the other hand, in a brief and sound paragraph, to be desirable training for the equally vital object of a free society, in that it opposes the arbitrariness of authority. But as an effective teaching method it receives scant attention.

The report does assert that it is important for the student to become aware of the methods employed in the various areas of knowledge by using them. Regardless, however, of these and other assertions that method of teaching is important and has principles, the report fails to work out the principles. It seems to suggest that *what to teach* is affected by broad underlying concepts and philosophy, while *how to teach it* is a combination of specific techniques with natural teaching instinct and enthusiasm. Mark Hopkins is recognized as the essential ingredient that he is, but he is pictured as still proceeding by rule of thumb.

The committee admits as much. On the next to last page, a brief discussion of radio and films is concluded. After summarizing their advantages and disadvantages, promise and danger, the committee throws up its hands at the task of testing these "new media" by the application of general principles, saying that "the psychologic assumptions, the philosophic coördinates upon and by which to test and place them remain 'with one foot in the unconscious and the other in the Middle Ages'." Likewise, intensive study over a short period, as in wartime study of foreign languages, is not analyzed, but is dismissed with the statement that it should be carefully considered and will, "it seems safe to assume," be found valuable for some subjects and not for others. Repetition, a didactic method utilized in the report itself, is said to be good on pages 115 and 146 and bad on pages 138, 141, and 217 — possibly with complete consistency, if only the guiding principle were furnished.

Perhaps the best illustration of the inferior status accorded to methods of instruction is the treatment of the tutorial system. Tutorial and advising are deemed important enough to be the only methods specifically mentioned in a heading, and to be assigned twelve pages. Yet the discussion is palpably inadequate. It is largely concerned with the difficulty of getting good tutors and the expense of the system — important matters — and with detailed administrative recommendations for fitting the tutorial system into the course system at Harvard. There are assertions that tutorial contributes to breadth of view, maturity of judgment, and increased capacity. But there is no explanation of how these desirable results take place, no analysis of the essential nature of the tutorial system, no discussion of how it, as compared with the system of courses, textbooks, and lectures, is involved in the attainment of the objectives of general education. While the report recognizes the need of better textbooks, it does not recognize that courses, textbooks, and lectures themselves need to be justified. When it is said that "a general survey is apt to be a dreary and sterile affair," the reader, especially the reader who has been to law school and experienced another method, thinks: "*All* lecture and textbook courses are apt to be dreary and sterile affairs." Although "mere courses" for the less gifted are questioned, the course system is taken for granted.

In spite of the previous reports on the tutorial system, to which reference is made, the committee felt that it should consider this system "if only because of the possibility that tutorial instruction *might be more closely related to general education*." (The italics are mine.) This illustrates the essential fault of the report; it is forgotten that method of instruction is not something separate that is to be "related" to general education, but is, on the contrary, the heart — one of those two hearts — of education itself.

This forgetfulness is particularly inexcusable in a university that contains the Harvard Law School, inventor of the case method of instruction. This method consists of Socratic discussion of law cases, instead of lecture and textbook description of legal

principles. Most graduates of the Harvard Law School — and of the other law schools too, I imagine — believe that their capacity to deal with legal problems comes more from the case method than from any particular legal subject matter. Many would even overstate the point by saying that the results would have been equally satisfactory if most of their law school courses had dealt with entirely different subjects. What these lawyers think they attained by the case method is some of the intellectual discipline described in the report, and some of those basic mental abilities which it emphasizes as the paramount objectives of general education: "*to think effectively, to communicate thought, to make relevant judgments, to discriminate among values.*"

It is true that we now believe that the case method, or rather the casebook and case part of it, has been overdone, but only to the extent of being used too exclusively, not too intensively. In describing the revised program of the University of Chicago Law School, Dean Katz said (1937): "As a device for training students in analytical thinking . . . the case method is of the highest value." The report of Professor Llewellyn's committee entitled "The Place of Skills in Legal Education," published in the *Columbia Law Review* in 1945, contains the following:

> On the basis of our current case-instruction, the upper range of student develops rapidly a whole series of somewhat intangible but magnificent by-products in the form of legal skills which appear to flow, not from the subject-matter of any course or courses, nor yet from any particular instructor, but rather from a period of exposure to "the" method in different varieties. . . . The results are visible in law review work which (whether supervised or student-run [e.g., *The Harvard Law Review*]) demonstrates undergraduate ability in the top brackets, not only to analyze, but to investigate, not only to investigate but to do small-scale critical synthesis, and not only that, but also to organize composition on a moderately effective level.

To this Llewellyn adds a footnote of special interest in view of current proposals to extend this other law school method, law review work, to students of less than top ability:

> Among the chief elements which law review training adds to case instruction are: Concentration on a particular problem; attempt at complete coverage; independent research; writing with careful stress of accurate thought and statement. . . .

Clearly these teaching methods, both case method and law review, are no matters of narrow professional training, of interest to special education only. They would seem to contain elements and illustrate principles that are fundamental to those four basic objectives of general education, especially in developing free citizens in a free society.

What are those elements and principles? The nearest the report gets to the case method is in making the specific suggestion — an excellent one — that teachers "bring concrete reports of actual cases for discussion with the students." The only mention of Harvard Law School is a bare reference to the new seven-year program leading jointly to the degrees of A.B. and LL.B. aimed to establish closer ties between the Law School and the college. Not only are general principles that may be exemplified by law school methods neglected, but those likewise that might be exemplified by methods of teaching that are listed as desirable in the report itself. For example, in connection with natural science, both in high school and in the Harvard laboratory, it is said that the student should be led to explore matters for himself and be presented with *problems* of which he does not know the answer. But problem-solving in natural science is not hooked up with problem-solving anywhere else. Nowhere does the discussion bring out how far a problem-solving attitude may have general application to method of teaching.

I do not know whether there is any such general application or what the relevant principles are. I had supposed that such principles were at least struggled with in schools of education, even if with feet in the unconscious and the Middle Ages. In his introduction to the report, President Conant praises its unanimity as a heartening relief from the constant belaboring of each other by the "educators and school men" and the "professors." This conflict, it is stated, involves the charge by the college professors that the schools of education are

so taken up with "methods, psychology, and administration" that they make of teaching "an elaborate and largely incomprehensible pseudo-science instead of the essentially clear and straightforward task that it should be." This charge is not wholly substantiated by the report, certainly not the part about making teaching incomprehensible; but the rest of the charge *is* supported by the fact that the three committee members from the Harvard faculty of education concurred in a report which describes many methods of teaching but does not attempt a broad scientific synthesis of those methods. If it is attempted in schools of education, why did these professors of education allow themselves to be pushed to the side lines, instead of insisting that at least one of the six chapters be on the general principles and philosophy of how to teach? Those principles and philosophy have as important implications for general education as anything in the report. It may be that these professors were silent in the belief that those principles and that philosophy, having to do with all education, were out of place in a report on general education. If so, the numerous references to specific methods of teaching are also out of place. Of course, neither is out of place. Both should be included. Perhaps practical considerations are responsible for the omission, such as the problem of combining the contributions of different members of the committee in the space deemed available.

Since they are not worked out the layman can only guess what these underlying principles of method are. One of them, I suspect, is that education is a process "in which the pupil is the chief actor." (I am quoting Harvard's President Lowell, 1938.) The report nowhere indicates that this may be the thread that runs through its various recommendations that students "use their own powers of performance" in specific subjects, such as reading hard English books, and in problem-solving in natural science, as mentioned above, and that "*in the arts* learning is bound up with doing." (Italics mine) But toward the end, in discussing adult education, the committee seems to realize that there is a principle here and that it has been neglected. The report has 267 pages. On page 260, it says: "This report thus far may have seemed to conceive of education as solely a relation of student to teacher. Yet education is primarily self-teaching." In truth, in spite of much to the contrary, the reader now and then gets a whiff of the atmosphere — "Olympian" the report calls it — that teaching consists in casting pearls and in trying to get the shoats to receive those unwelcome objects. "Of course, it would be foolish," says the report, in discussing secondary schools, "to expect young people always to love learning to the same degree that they love sports. Yet with the proper school atmosphere it should be possible to inject some of the zestfulness of activities into studies." The statement is, of course, true, the "always" having been fortunately inserted, one can imagine, to preserve the honor of the committee as educators. But what a timid tone!

Nevertheless, this apologetic, defeatist expression of the hope that some day studies may catch up with football shows an awareness not only of the fact that the student ought to function actively, but also of something that I deem to be a second great underlying principle — or is it part of the first principle?: the importance of the student's emotional attitude. "Love" and "zestfulness" are the key words. The report contains references to "zest for intellectual integrity" and to the fact that students' wills must be enlisted for what their minds accept. Zest is the thing. There is hope — the report does not mention it — that the seven-year joint program with Harvard Law School, like the program of the University of Chicago Law School incorporating economics, political theory, and psychology, will help the student bring to his college subjects the zest with which he studies law. The student in these two law schools *does* love learning not only to the same degree but to a much greater degree than he loves sports.

Let the educators tell us, if they can, why this is so, and how some of this zest for preparing for a profession can be imparted to preparing for life. Let them tell us the essential ingredients in that

zest for modern primary and secondary schools that prevents so many young children from preferring sports to their studies. (The committee believes that primary education is more satisfactory than secondary or higher education, and gives that as a reason for *not* dealing with it!) Let the educators test the course, lecture, textbook, and other systems of instruction by their principles, and do it before our laymen's eyes. The report says that general education is distinguished from special education in various terms, including method, and that the relationship between general and special education "needs far more thought." Let the educators do that thinking aloud. Let them describe not only the common principles that run through various methods of instruction, but show how far they can be applied to differing subject matter and to students of differing gifts.

The report recognizes, in passing, that it is "very doubtful whether the intellectual discipline involved in all subjects, in chemistry, for instance, and in literature, is identical, or even very similar." Mathematics, however, is said to help "build some of the skills and comprehensions that make the effective individual." Let us hear more about this, a lot more; not technical studies of "transfer," but in general how far you can teach different things by the same method and how far by different methods, and whether method is so fundamental that there is even a principle of some usefulness that that teaching is best where the student comes nearest to doing in the classroom those four basic things that the educated man does in the world. Such a principle is hinted at in several places, for example, in pointing out that habituation and experience, like those gained in extracurricular activities, "are necessary for the development of any skill including intellectual skills," and, again, in one of those significant passages in which the report abounds — one of the few where method of teaching is discussed in the light of general principle:

> Education must be so contrived that the young, during the very process of their schooling, will realize the difference between abstractions and facts and will learn to make the transition from thought to action . . . . The aptitude of making relevant judgments cannot be developed by theoretical teaching; being an art, it comes from example, practice, and habituation. The teacher can do a great deal nonetheless; he can relate theoretical content to the student's life at every feasible point, and he can deliberately simulate in the classroom situations from life.

I suppose that there are volumes of professional literature of education dealing with these questions, even if there are few sure answers. So, doubtless, are there other and more numerous volumes dealing with what is discussed. Their existence does not make the report less valuable. What is needed to fill the gap is another report, like the present one in having prestige and in being a place where educators and laymen can get on common ground; and above all, like the present report in having the same breadth and sweep and readability.

Science in General Education

BY SIDNEY J. FRENCH

PROGRESSIVE thinking in liberal education reached a peak during the war when civilians were largely absent from the campus, and regimented military programs made most anything else seem preferable. Blueprints by the score poured forth from college faculties with the prayerful hope that the lag between war's end and the return of veterans to the campus would provide the leisurely time to convert prints to production.

The lag never came; the new model in college education is either being produced concurrently with the 1942 model, or not at all. And if it is being produced, the job is being done under circumstances which are, to say the least, staggering in magnitude. More than one college has laid its blueprints away for the time being. Some are putting new grills on the old model. Others are struggling with production lines in which a new body is being fitted over the old chassis. Still others, having resolved to make the break clean, are shoving a new chassis slowly along a resistant production line with a crew wearied by war and supplemented by inexperienced hands. What the final outcome will be is a matter of serious concern to many an educator. Certainly the loss, on all production lines, of the idealistic enthusiasm which prompted yesterday's ferment — to change the figure of speech — would be a serious matter for American college education. Though the ferment may have produced much wasted gas, the leavened loaf must not be allowed to fall.

As one of those colleges which made the decision to translate its plan into production, come what might, Colgate is not only committed, but is moving its new model of general education along the rough production grade.

In assessing the college's prewar experience of more than fifteen years with general education, the Committee on the Postwar College came to the conclusion early in 1944 that general education was not only worth keeping but worth improving and extending. The committee was not unconscious, however, of the weaknesses, both of general education and of the particular type of general education developed at Colgate University in the late twenties and early thirties. This plan involved four survey courses in the freshman year — one each in physical science, biological science, social science, and philosophy and religion. A fifth survey course, in fine arts, was given in the sophomore year. These courses were, by no means, failures. Carefully integrated within themselves, well taught by staffs who spent many extra hours considering both the philosophy and content of the courses, the surveys formed not only the broad base of a liberal education, but served as well to whet interest in more specialized fields.

The major weaknesses of these courses in the committee's judgment were, first, their encyclopedic nature and emphasis on facts and, second, their tendency particularly after the publication of the Colgate series of textbooks for the courses, to become somewhat standardized and even regimented. Though standardization is not of itself a weakness, it tends to limit forward-looking changes.

Survey courses in science have been tried in many ways and many places and with results

that have been, on the whole, sufficiently encouraging to warrant further experimentation. Whether they are preferable to the more traditional distributive requirement of a laboratory course in some one science field is a matter over which teachers of science will argue everlastingly, and it is not the object here to belabor these arguments unnecessarily. It must be said, however, that there is little social, philosophical, or educational justification for a distributive requirement which merely exposes the nonscientist to the basic course of a science sequence designed primarily for technical training. Nor does the student in such courses learn, except incidentally, anything of the great historical and contemporary impact of science on civilization.

Many teachers of science have, of necessity, become so concerned with the technical training aspects and technical importance of science today that they have had to forget their heritage of natural *philosophy*. It is high time we quit trying to sell science as a *technique* to those who have no wish or need to become technicians. It is even higher time, in the atomic age, to sell science as a part of the glorious but dangerous heritage of civilization, as a way of approaching problems which have altered and will alter our ways of life so rapidly and profoundly that humanity is unable to make the necessary adjustments. If the scientist does not tackle this vital problem, someone else will. If the scientist *is* going to tackle this problem, he must, for this purpose, make a clean break with traditional content and methods; he can no longer ignore the history of science as he has habitually; he can no longer argue that an understanding of the methods and the significance of science can only be undertaken after extensive and intensive training in the language and techniques; he must no longer substitute the symbols for the body.

I am not impressed by the argument that science, presented largely without its technical jargon, may be accused of superficiality. It cannot be more superficial than a glib memorization of symbols and formulas when there is no spirit of understanding behind them. Where in our traditional and technical basic science courses can we provide for covering the skeleton with living, pulsing flesh; the glory of a great discovery, the tragedy of a near discovery, the battle to provide food for the world, the marriage of science to war, the full meaning of atomic energy to the world? To do this kind of a job, the scientist and philosopher must once more extend the hand of friendship; they have been strangers too long. Nor am I thinking of such unhappy past experiments as pandemic chemistry, science and civilization, or science for the layman which unsuccessfully cluttered up prewar curricula.

In approaching this sort of a problem the Colgate faculty has seen fit to abandon the concept of coverage, even to the extent that the typical factual survey might do it, in favor of the exploration of fewer topics in greater detail. In fact, the committee has proposed — and development is proceeding along such lines in the several new courses in general education already underway — that all courses in general education utilize the *problem approach*. In some areas these may well be problems in the small "p" category, case studies of human relations. In others, such as science, they may be case studies in the larger sense; the study of the solution of a significant historical problem of science.

The resemblance of the new Colgate course in Problems of Natural Science to that proposed by Mr. Conant at the Conference on The Natural Sciences in the Liberal Arts College, held at Princeton late in 1944, is striking — but entirely coincidental. Ours was on paper before we knew of his. Nonetheless, it is encouraging to know that we are not alone in our attempt to "humanize" science. Mr. Conant proposed a "rigorous and detailed study of a few simple situations" as more instructive "than the necessarily superficial treatment of modern discoveries and application. . . ." He assumes that "for the nonscientist the value to be obtained from a science course at the college level should be an appreciation of the procedures by which the different branches of science have advanced in modern times." He adds: "The acquisi-

tion of a vast mass of information is to be considered of no significance. Introduction to a certain number of basic concepts is, of course, essential, but these concepts may well be limited in number." The objectives of such a course, Mr. Conant believes, should be, "to show by examples chosen from a wide variety of fields (within the area of accumulative knowledge) the methods by which knowledge has been advanced in the last four hundred years."

We would agree broadly and completely with the assumptions and objectives stated by Mr. Conant. We would, however, go one step further. If such a course is of value to the nonscientist because it stresses the *methods* by which scientists have attacked and solved problems, it should be even more valuable to prospective scientists, who, after all, get very little of either the philosophy of method or the social significance of science in their technical training; in fact, they often know less about the scientific method than those who have had a good course in the philosophy of science. We would also add, because of their social significance, some contemporary problems, the solutions of which have not yet been completed.

Working on the assumption, then, that the field of science is far too vast to attempt any sort of "coverage" in a general course — even the factual survey course must restrict its material to the point of superficiality — and on the further assumption that it is more important to give the student a feeling for the philosophy of scientific method — "how scientists attack and solve problems" — as well as for many of the difficulties encountered, Colgate University has set up as one of three freshman courses in general education, a new course in Problems of Natural Science. It goes without saying, in these days of pressure, that the course has not been worked out under ideal conditions and that we are far from satisfied with what we have accomplished thus far.

For the sake of course continuity, it would have been advisable to disregard all divisions between the disciplines of natural science, but for the sake of teacher manpower this seemed impossible. As a result, we have one term devoted to problems in physical science and the other to problems in biological science. The student may take either first.

Problems for such a course must be selected with extreme care. In the first place, they must be capable of comprehension without involving the type of background which goes far afield into technical language or mathematics. In the second place, they must form somewhat natural units which can be handled in sufficient detail in a period of several weeks. Further, they should illustrate some important historical or current crisis in science and where possible should have personal and social significance to the student. Finally, they should be capable of being handled in a reasonably precise manner so that the student gains something more than a mere qualitative appreciation of the methods and problems of science, and they should lend themselves to laboratory, field, or demonstration work. Obviously, few problems will satisfy all of these requirements.

Students accustomed to textbook assignments and to learning factual material can be expected at first to flounder and thrash in such a course, even though apprised in advance of the nature of the course. Typical early student criticisms included, "we don't know what the teacher wants or what he is driving at," or "we thought science was an exact subject," or, "there is too much reading to do in too many books," or, "if they want to teach the scientific method, why not just give us an outline of it and let it go at that."

Obviously, such a course can have no textbook, and the practical problem of supplying sufficient copies of source material for eight or ten sections of twenty-five students each is no small one. But the absence of a textbook is more a blessing than a curse in the judgment of the instructors; freshmen not only patronize the library, but find, surprisingly, that authors do not always agree. Perhaps it is not surprising to find, too, that these earlier student criticisms are disappearing and in their place are coming, we hope, deeper understanding of the meaning of science — and the course.

One of the more interesting criticisms, which incidentally points up an important failure in the more traditional teaching of science, is the feeling engendered that science is not exact, after all. The great tendency in science teaching, to stress only final results and omit all the struggles, mistakes, false starts, and weaknesses encountered in reaching those results, is bound to give students an unbalanced impression of science, which, if they go on in the field, may be corrected later. The great god, Coverage, has forced us to condense and eliminate supporting details and historical perspective, till nothing remains in many traditional basic science courses except a bare outline of knowledge as it is now accepted. It is little wonder that the student comes out with a distorted view and with the feeling that science moves forward like an automaton with none of the mistakes and foibles attributable to human weakness.

Though it may weaken the faith of the student in the triumphant march of science, it is nevertheless his right and his need to know that advancement of science depends on imagination and is subject to pressure, preconceived ideas, mistaken judgment, blind groping, and "hunches," as well as to the orderly steps of the scientific method. This point of view can be overdone, however, and should be balanced off by consideration of some problems in which there is little fumbling and the solutions are clear and logical.

One instructor, after spending some time presenting data supporting the geocentric theory followed by that supporting the heliocentric theory, has not yet convinced one of his students that the latter theory is the more sound. Be that as it may, the student will probably bat up enough evidence to convince himself in the end. If he does, it will be both a personal triumph and a triumph for the objectives of the course.

At the time of writing, the sections in physical science were considering the problem of combustion, and this may be taken as typical of the several historical problems included in the course. Incidentally, little attention is paid to distribution of problems equally among the several disciplines of physical science, though there is some attempt at a type of continuity in which the factual materials of one problem may be used in the next.

With the necessary disregard, under pressure of coverage, for historical perspective, most elementary chemistry books say little or nothing about the phlogiston theory of combustion which dominated the world of science for more than a century. If the student gets any concept of the phlogiston theory at all, it is that it was a silly thing which no one in his right senses would even give a second thought to. Yet — and it is not too surprising — a sound case can be built up for this supposedly fanciful theory, *on the basis of the known knowledge of the times*. Practically all the facts of combustion now known can be satisfactorily explained, including a phlogiston cycle comparable to the oxygen-carbon dioxide cycle of nature. Many students who had taken a course in secondary school chemistry and were currently taking general college chemistry were amazed at the number of facts which could be satisfactorily explained by this simple and comprehensive theory. With this sort of background the important revolution in chemistry took on new significance. Students were excited to find out how and why the theory was overthrown.

Then comes the Chemical Revolution. The student studies some of the works of Priestley at first hand to note both his blunders in reasoning and his clever manipulations in experimenting. . . . He follows the course of Lavoisier's first "hunch" and subsequent attempts to establish a new theory on the basis of insufficient evidence. A chronological table is most valuable here in illustrating both the importance of timing in scientific discoveries and the interdependence of these discoveries. Demonstrations show how, why, and where Priestley made his mistakes in reasoning. Finally, he sees Lavoisier take Priestley's results — and incidentally learns something of scientific ethics — to establish the oxygen theory of combustion. He follows through Lavoisier's masterful experiment which shows convincingly that air is composed of two

gases, one of which is inert and the other of which is responsible for combustion. Then, he goes on to the controversy over the composition of water involving Cavendish, Priestley, Watt, and Lavoisier and ending with the use of Cavendish's results by Lavoisier to verify his new theory and answer the one question which had remained unanswerable till it was known that water was composed of hydrogen and oxygen. From this great episode in the history of science, with its remarkable coincidence in timing, the student can then extract the scientific steps from the extraneous to see how science advances in the face of tradition, false interpretation, bias, and even stupidity. Incidentally he learns some fundamental science, too.

Just what would the student be expected to get from the problem on combustion? Certainly not a glossary of phlogistic terms or even a complete understanding of the Chemical Revolution. Priestley's writings must be annotated for understanding, and Lavoisier's nomenclature would have little meaning unless the student had taken a course in chemistry. He gets instead a sense, a feeling, an appreciation of the bumpy way in which science moves ahead. He learns that scientists, even the greatest, make many mistakes; that imagination and boldness are essential to establish new principles, that a scientific hunch may sometimes lead to surprising results, that thinking is often so channelled in grooves of the past that nothing short of an upheaval can provide new channels, that decisions must often be made on the basis of incomplete evidence even in science. He learns that the scientific world is slow to accept new ideas, even as is the nonscientific world, and that a "self-evident" truth is not always so self-evident to those who did not discover that truth.

These are generalizations, and no student will carry all of them away with him. If he carries one or two, the two weeks spent on the problem are worth the time. Perhaps the most important concept the student gets is not the steps of the scientific method, but the difficulties of divorcing extraneous facts and incorrect hypotheses from those steps. Therein lies the acme of scientific imagination.

It must be confessed that examining the student in such a course presents its own problems. Certainly the traditionally factual or objective examination is of little value. On the other hand, testing procedures must follow the objectives and ideals of the course; they cannot determine the nature of the course. As yet, no fixed pattern of examination has been developed, and heavy reliance is placed on the instructor's judgment augmented by class discussions and papers.

Perhaps the most important problem in such a course is that of the teacher. Where, in the first place, does one get teachers with the necessary breadth of training and outlook; and, in the second place, can such teachers be expected to do this work at some sacrifice of departmental teaching or research? There are no simple answers to either question. Fortunately for us, our experience with survey courses has provided a core of teachers, drawn from the several science departments, who were, either through self-education or earlier training, prepared to handle the broader course. It meant sacrifice and plenty of "boning up" on the part of many, however. This same core, augmented by additional staff, has tackled the new course with enthusiasm, understanding, and a considerable degree of success. We had long ago reached the conclusion that it was better to have one teacher carry a section of survey through the entire term than to bring in "experts" in each part of the course; we have had no reason to shift our conclusions in the new course, though "experts" lend a hand at times. Obviously, the course is based primarily on the discussion method; the lecture plays little part, though large groups may be brought together for demonstrations and movies occasionally. None of our teachers devote their full time to courses in general education though most of them participate in the program.

There is much to be said for the platitude: Mark Hopkins, a student and a log; one gets a little tired, however, of hearing that curricula and methods are of no importance, and all that is

needed is a great teacher. These come one in a thousand, and the rest of us will do the most effective teaching when some attention has been paid to methods as well as courses which permit and promote the most effective teaching. This is certainly one of the important objectives of the course as far as the teacher is concerned.

Laboratory work has proved something of a problem. Thus far, the staff in biology has solved this problem better than that in physical science — though at a high cost in manpower. Demonstrations, movies, and field trips have been used, but the ideal of small sections carrying on laboratory work has not yet been attained to any extent in physical science. The biology course has also run into certain difficulties not so apparent in the physical sciences. It is less easy to isolate a biological problem for study, particularly if it has physiological aspects, without, of necessity, bringing in a heavy glossary of terms, and understanding of technical backgrounds. We feel, however, that this difficulty can be overcome; in fact, it is being overcome by a more searching selection of problems.

It does not seem right to close this paper — which must be regarded in the nature of a progress report since the new course in natural science has not yet run even a full semester — without calling attention to one unique and brief problem which our geologists have provided. It is the problem of the Carolina Bays. In the January 9, 1944, issue of the *Saturday Evening Post* there appeared an article on these controversial bays in which their origin was attributed to a bursting meteor of great size and mass. That same month there appeared in the *American Scientist* an article by Dr. Douglas Johnson of Columbia University on the "Mysterious Craters of the Carolina Coast, A Study in Methods of Research." In this article, after first building up the meteor hypothesis as a reasonable one, he refutes it step by step. In doing so he comes to a less spectacular and more complex conclusion which illustrates to a surprising degree of satisfaction the steps of the scientific method. It serves as an excellent antidote for those students temporarily concerned about the inexactness of science.

Nor does it seem right, either, to close this paper without some word about the men who have foregone vacations, worked nights and through the summer in order that this experiment might go into operation on schedule; who have, since that time, met weekly and oftener to keep one jump ahead, to thresh out diverging points of view, to compare and contrast operation with ideals; in short, to carry the burden of a new, and somewhat unorthodox, course over the rough production line. Clement Henshaw, associate professor of physics and Robert Todd, assistant professor of zoology, have, as respective chairmen, carried the burdens of organization and administration of the course. Back of them have stood all members of our science staffs, endorsing and supporting the experiment. With this kind of work and support, the chances of success are as good as could be asked for, in spite of the unfavorable nature of the times for new experiments.

Following are complete lists of problems used in the course during the first term of operation.

Physical Science (Core Course 1)

Does the earth travel around the sun, or the sun around the earth?
How did the solar system originate?
Where did the moon come from?
What caused the Carolina Bays?
Why does the temperature of the air decrease as one goes to higher altitudes?
How can man get up in the air?
How high in the air can we go?
How fast can an airplane fly?
What is combustion?
Where does atomic energy come from?

Biological Science (Core Course 2)

Are there any structural and functional features common to all plants and animals?
How is the earth's food supply continually renewed?
Does blood circulate?
How is the constancy of the water content of the blood maintained?
What causes rapid breathing during exercise?
What is the work of the stomach?
How are traits inherited?

How to Ask a Question

BY WENDELL JOHNSON

IT IS known almost as widely as it is disregarded that a fool is one who knows the answers to the questions that only a fool would ask. It follows that effective insurance against becoming a fool oneself lies in knowing what sorts of questions and answers these might be. It would appear reasonable to assume, on this basis, that a major responsibility of our schools and colleges is that of providing adequate instruction in the techniques of fruitful inquiry. And if this responsibility is to be taken seriously, rather more emphasis is to be placed on the questions students ask, and relatively less on the answers they regurgitate, than is apparently customary.

Most students would seem justified in concluding from their classroom experience that most instructors labor more zealously to teach answers than to stimulate questions. Most textbooks, and most of the instruction based on them, seem designed to encourage the student to lay hold of the knowledge and opinions they contain, rather than to explore the sources of that knowledge, the validity of those opinions, and the vast reaches of fact and theory that lie beyond the textbook boundaries. It is probably a general rule that the majority of students finish their courses without having learned how what they have learned came to be known in the first place. Even among college upperclassmen and graduate students one finds in varying degrees a naïve belief that there are *knowers* — that the way to get the answer to a question is simply to ask the man who knows it. The notions sometimes expressed by young children as to where babies come from are remarkably plausible compared with the views expressed by many college students as to where knowledge comes from.

In order to discuss this matter effectively it seems essential to be especially clear about the obvious. In this case the obvious is that babies from the beginning of the race have been born — and they are still being born — without knowledge or opinions. Even textbook writers, university professors, and the authors of The Hundred Great Books have come into the world blessed with the bliss of ignorance. Anything they have come later to possess, or to express, in the way of information had to come from somewhere outside the covering of skin and modified skin separating them from the external environment. And before it penetrated this thin pink barrier and became their own information, what was it, where was it, and how did it get in?

So far as we know, it was some sort of energy radiation: light waves, sound waves, mechanical pressures, etc. These impinged upon nerve endings in or near the skin, and in this way they "got in," through processes not yet fully understood, by becoming transformed into nervous impulses. What we call "information," and "interpretations" of this "information," is what the individual's nervous system makes out of the nervous impulses set up by stimulation of the nerve endings. All this means that the known is necessarily a joint product of the knower and the knowable. It means that what we can have a theory of is, first of all, a disturbance in our own nervous system. It is a relatively standard assumption, of course, that the

character of this disturbance is determined in part by the character of the energy radiations impinging on the nerve endings — and in part by the state of the nervous system prevailing at the moment of impingement. What we call knowledge comes, therefore, from two sources: those energy radiations in the external world to which our nerve endings are responsive, and the conditions prevailing inside our skins when our nerve endings are stimulated. The obvious implication is that any student who graduates from college without having made quite good grades in physics and in physiology can hardly be expected to give a coherent answer to the question: "Where does knowledge come from?" He will probably think it comes exclusively from books and teachers — and from singing commercials and political campaign speeches. He will be likely to value words above nonverbal experience.

A further clear implication of these statements is that techniques of fruitful inquiry necessarily involve certain ways of using language, particularly in the framing of questions. Just any old string of words, arranged grammatically and with an interrogation mark at the end, won't do. In order for a question to be meaningful, it must be answerable in words that refer, directly or indirectly, to the possible sources of information: events within the nervous system and the external events by which they are affected.

Put in more familiar terms, this means that an answerable question is one that implies the observations, or reliably reported observations, needed to answer it. Any question that does not meet this test — any question, that is, for which no specifications are supplied as to the particular observational procedures to be used in answering it — is to be classified as meaningless for purposes of fruitful inquiry, as nonsense from an investigative point of view. From a psychiatric point of view it may be richly meaningful, of course. This is to say that anyone who can analyze and interpret such a question in a way that clarifies the confusion of the one who asks it qualifies, to this extent, as a psychiatrist. Anyone who unhesitatingly answers the question, without recognizing its meaningless character, qualifies as surely as a fool. One may, with benefit, regard this as one of the more important items in that vast category known as useful but seldom used information.

These remarks are intended to summarize what has come to be known as the operational — or, more comprehensively, extensional — principle in the use of language for purposes of inquiry. Like many other modern notions, it is an old idea that has more or less recently been given increased emphasis, refinement, and systematic statement. It has been stated well by the physicist P. W. Bridgman of Harvard in *The Logic of Modern Physics*,[1] in 1932, and by many other writers since then. Aside from the attitudes of acceptance and endorsement, there have been two major reactions to this extensional principle. The first, which is, properly speaking, no reaction at all, is that of ignorance concerning it — or of failure to attend to it. This probably characterizes by far the majority of the population. The other major reaction appears to range from incredulity to vigorous rejection. This is at least understandable. Application of the principle requires such a drastic change in the questioning and answering habits of most of us that the prospect of it quite readily prompts both bewilderment and resistance. The principle has been formulated in practical terms, and its implications for the individual and for society have been elaborated, by Alfred Korzybski in *Science and Sanity*,[2] and by other writers in the field of general semantics. A peculiar mixture of incredulity and antagonism, doubtless quite common, was recently expressed by a presumably "well educated" gentleman who said, "The trouble with general semantics is that it doesn't provide for belief without evidence." [3]

That is precisely "the trouble." Belief without

[1] P. W. Bridgman, *The Logic of Modern Physics* (New York: Macmillan, 1932).

[2] Alfred Korzybski, *Science and Sanity: An Introduction to Non-Aristotelian Systems and General Semantics* (Lancaster: Science Press, 2nd ed., 1941).

[3] Reported to the writer by Benton W. Harrison, Jr., president of the New York Society for General Semantics.

evidence goes by various names; when we are trying to be charitable we call it faith, and when we are trying to be rigorous we call it delusion. And the trouble with much of the teaching in our schools and colleges is that it encourages belief without evidence. It does this largely by neglecting to make clear what constitutes evidence, the procedures by which it is obtained, and the role it plays in the answering of questions and the validation of statements. This grave deficiency in our education can be made up to a significant degree and in a peculiarly direct and practical manner by teaching students, not in one course or at one educational level but in all courses at all levels, how to ask questions.

This amounts to saying that the deficiency can be made up by training students in the use of scientific method — but scientific method differentiated quite clearly from specific and highly specialized technologies. After all, any skill the ordinary student may acquire in courses in physics or chemistry in the use of the microscope is likely to be of extremely limited value to him in his subsequent efforts to grapple with the moment-to-moment problems of daily living. General scientific method, on the other hand, can be of tremendous value to him in dealing with these problems. In fact, it is, so far as the present writer is aware, the only effective problem-solving method ever devised — and the question as to what method people use to solve their problems when they do not use the scientific method is very provocative and fascinating indeed.

What is meant here by scientific method may be outlined briefly as a four-step procedure. It consists in

(*a*) asking clear answerable questions in order to direct one's (*b*) observations, which are made in a calm and unprejudiced manner, and which are then (*c*) reported as accurately as possible and in such a way as to answer the questions that were asked to begin with, after which (*d*) any pertinent beliefs or assumptions that were held before the observations were made are revised in light of the observations made and the answers obtained. Then more questions are asked in accordance with the newly revised notions, further observations are made, new answers are arrived at, beliefs and assumptions are again revised, after which the whole process starts over again. In fact, it never stops. Science as method is continuous. All its conclusions are held subject to the further revision that new observations may require. It is a method of keeping one's information, beliefs, and theories up to date. It is, above all, a method of "changing one's mind" — sufficiently often.

Four main steps are indicated in this brief sketch of the scientific method. *Three of them are concerned primarily with the use of language*: the asking of the questions that guide the observations, the reporting of the observations so as to answer the questions, and the revising of beliefs or assumptions relevant to the answers obtained. . . . *The language of science is the better part of the method of science.*[4]

From this point of view, training students in the use of scientific method is primarily a matter of teaching them how to ask questions that can be answered clearly by reference to observations that have been made, or that conceivably can be made, by means of known or at least roughly conceivable procedures. Formidable as this may sound, it implies nothing more than requiring students — and their teachers — to know what they are talking about. Just how an educator, or anyone else, might defend his opposition to this simple requirement is not altogether obvious — nor is it apparent that the requirement is consistently met by all present-day educators, to say nothing of their students.

The fundamental skill to be taught is that of specifying the procedures to be used in making the observations needed to answer any questions one asks — and in specifying the terms in which the observations are to be reported. Except as the questioner provides these specifications, he can hardly expect anyone else to divine what he is asking, nor can he be depended upon to recognize the answer himself if by some odd chance it should appear. If a person wants to find out, for example, whether his wife loves him — or whether Shakespeare was a greater man than Napoleon, or whether the United States should follow a tough or a soft policy in dealing with Russia — he must make quite clear what he will or will not accept

[4] Wendell Johnson, *People In Quandaries: The Semantics of Personal Adjustment* (New York: Harper and Bros., 1946), pp. 49-50.

as evidence. If he cannot or will not do that, he is plainly indulging in verbal shadow-boxing, and anyone who joins him in it would do well to understand and consider the risks involved.

There is to be considered the further skill involved in gauging the reliability of an observation, or, more precisely, of the report of an observation. According to standard scientific procedure, the basic rule is this: given comparable opportunities and facilities for making a given observation, and comparable terms for reporting it, the more agreement in the reports of the more observers, the more reliable the observation. This implies, of course, that in asking a question, one is obligated to specify not only what observations are to be made in order to answer it, but also what is to be done to insure a report that will be sufficiently reliable. Reports are never absolutely reliable, of course, and so the extent of agreement among observers that the questioner will accept must be indicated.

If one cares to be relatively rigorous in this connection — and presumably there are advantages in being as rigorous as circumstances allow — the branch of mathematics known as statistical method provides simple and practical techniques. Such elementary notions as distribution of measures, mean, median, probable error, and correlation involve merely the arithmetical computations taught in the elementary grades. And it has not been demonstrated that the probability principle which governs the thinking done in the field of statistics is either inappropriate or "too difficult" for school children, to say nothing of university students. If a probability orientation is to replace the currently predominant authoritarianism, absolutism, and categorical thinking in our schools, however, it will doubtless be necessary to revise most of our textbooks, workbooks, and laboratory manuals, and to re-examine prevailing examination methods, in so far as they are based on the assumption that answers are either right or wrong. This would unquestionably be a tremendous undertaking, if only because of the opposition of entrenched authors and publishers of texts and tests. The probable benefits, however, would appear to make the difficulties of the undertaking seem irrelevant. Besides, if one may judge from the record of comparatively modern educational developments, an increasing trend toward a pervasive probability orientation at all levels of education would seem quite inevitable.[5] Participation in the trend would appear to be, for any given teacher, merely a matter of keeping more or less abreast of the times, a prospect that hardly calls for hardy pioneering.

The ability to ask meaningful questions, answerable on the basis of available or obtainable reports of observation and verifiable experience, would appear to be basic to many of the skills that teachers presumably strive to develop in their students. Among these skills those that involve responses to and with symbols are conspicuous. Writing, speaking, reading, and listening are the labels usually applied to the more common ones. They enter into those more subtle and complex activities generally referred to as being critical, discerning, evaluative, creative, original, etc. They are important, therefore, not only to the professional scientific research worker, but also to the teacher, editor, executive, lawyer, artist, physician, and to any citizen engrossed with the common challenge and responsibility of getting along as effectively as possible with himself and with others. In other words, there is no one for whom reasonable skill in talking sense, and in detecting nonsense, is a sheer luxury. The ability to spot a phoney question, or a phoney answer, particularly in one's own speech, is essential to sanity itself.

The clear implication of this is that the method of science, as here construed, is by no means to be limited to what the curriculum committees speak of as "the sciences." In fact, "the sciences" are not infrequently taught in such a fashion that students gain very little, if anything, from them in the way of skill in the *generalized* use of scientific method. They customarily learn more scientific answers than scientific questions — or, more aptly, techniques of formulating questions scientifically

[5] Harold A. Larrabee, *Reliable Knowledge* (Boston: Houghton Mifflin, 1945).

— from their instructors and laboratory manuals in physics, chemistry, zoology and the other "sciences." What are being discussed here as the techniques of fruitful inquiry are to be taught and learned as readily, and perhaps with even more pervasive significance, in courses in the humanities — in literature, history, and psychology courses, for example — as in the technological fields. Indeed, if this is not to be the case, we are not unlikely to witness the cultural disintegration to be expected from the efforts of men to manage a technological society by means of prescientific habits, policies, and institutions.

A paper of this sort cannot pretend to be a handbook, setting forth in cookbook fashion the recipes for effective inquiry in each of the highly varied academic areas and practical situations in which the extensional principle is to be applied. The modest purpose of this discussion will have been fulfilled if the general requirements of "answerability" in questions have been indicated. The details of training students how to frame questions in accordance with these requirements must vary in some respects from one course or subject-matter area to another — and from one everyday life situation to another — and no teacher can hope to find in rules of thumb a substitute for alertness and ingenuity in adapting instruction to specific students and circumstances. The alertness and ingenuity required are doubtless well within the range of accomplishment for most of us, most of the time, for the basic principle to be applied is simple: for a question to be meaningful for purposes of fruitful inquiry, the procedures to be used in making the observations needed to answer it must be specified — at least roughly. In other words, of every question the question is to be asked: Under what conditions, with what methods, and with what safeguards of reliability are the data needed to answer it to be obtained? And this principle is to be applied wherever inquiry is seriously undertaken, whether in the laboratories of nuclear physics, the courts of the law, the church, the school, the office, home, or anywhere at all. Whether the problems involved are classified as technical, ethical, moral, political, educational, personal, or in some other way, it is hardly to be expected that effective discussion of them can be carried on by means of vague or meaningless questions to which only equally vague and meaningless answers can be given. There are no realms of discourse where the basic rules of talking sense can be profitably set aside.

What this could mean for the classrooms of the world, if taken seriously, may be exhilarating or staggering, even threatening, depending on the loyalties, commitments, and vested interests motivating one's point of view. But the indicated changes in educational objectives and procedures would hardly seem difficult to achieve, given sufficient interest in achieving them. As Stuart Chase has so pointedly put it: "The rudiments of straight thinking are not hard to learn, they are just unusual." [6]

[6] Stuart Chase, "Mr. Dies is a Communist, Too," *New Republic*, January 29, 1940.

Atoms and the Enlargement of Science

BY PHILIP MORRISON

"ANOTHER article on the atomic bomb?" you ask, with a quite justified and rather skeptical air of surfeit. The bomb is nowadays the most used and strongest peg of public discussion. Everyone hangs his arguments upon it. If they were good arguments years before the curious discovery of Otto Hahn, they are so much the better now. Whether you argue for the Parliament of Man or for a contemplative Sunday, the bomb is your prime example and demonstration. The present essay is somewhat different. I admit that the case here presented was not made stronger by the discovery of atomic energy. But the effect of that discovery was great. It serves to advertise the issue, to indicate why the problem needs attention, to prove that the men of the laboratory — and the proving ground — must be involved in the broad current of education.

The teaching of science (I shall speak entirely of the natural sciences and chiefly, though not entirely, of the physical ones) has had two principal ends. The first has been the vocational one, to make competent engineers and agriculturists in the largest number, and to perpetuate and swell the ranks of the academic scientists. The second, which has gained ground rather more lately, is the general exposure to diluted science, made usually in the name of displaying the "scientific method." With the two forms — the long vocational course and the short unspecialized series — it is not easy to quarrel. Certainly there are the two purposes to serve. It is rather the content and the attitude of the college science which will be examined in this paper. Whether Physics 1*a* needs more or fewer hours or whether different subdivisions of the field are needed between physics and chemistry are not unimportant questions, but demand a technical study on the spot rather than general public discussion.

The primary end of science is the gaining of knowledge of the physical world. But this knowledge cannot be won by standing aloof and passively observing the world. The scientist must experiment; he must actively interfere with the course of things. As his knowledge grows there comes with it an increasing power of control over phenomena, a control based on understanding. And as he exercises that control, as he more and more finds ways to produce new conditions and tools to probe new properties, so his knowledge in turn grows from the new-found powers. The astronomer makes spectra in the laboratory. From his nebular observations, he sees spectral lines never before seen on earth. But by producing discharges under very low pressures, and by using the theoretical knowledge gained by spectroscopy, he finds that the new lines are not lines of a new atom, but simply the "forbidden" lines of familiar elements which under terrestrial conditions cannot be intensely emitted. The physicists and engineers of the first thirty years of the century learned enough about high vacua and electrons to produce the myriad devices of electronics. With this new power it was possible to make the electronic tools upon which modern nuclear physics depends. Then the neutron and nuclear fission and the chain reacting pile could be built. With these in turn new knowledge will be secured for

new and greater power. The end is surely never.

But at the same time science knows limitations. Indeed, it is just the recognition of its limitations that gives natural science the power to change the world. The way the world is built guarantees that the forms of energy we now know are all conserved; no scientist tries to construct a perpetual motion machine. It is this dual character of science as knowledge which confers power but not arbitrary power which the teaching of science must emphasize. The atomic bomb has indicated the public misunderstanding of this question. Its production was viewed as another outcome of some mysterious magic. On the *Chief* approaching Santa Fe one of the men of the Los Alamos Laboratory met a stranger who proved very articulate and well informed. They discussed the question of a defense against the atomic bomb. The stranger turned out to know about that too. He had worked it out himself a little, he said, though he had not much scientific training. Some details were still uncertain. "How is it done?" my friend asked. "With the universal ray," replied the traveler. "Those rays haven't been discovered yet, but the scientists will do it in a few years." The traveler was an educated and intelligent man; he proved to be a member of the House of Representatives. But he was able seriously to talk nonsense if it was about science.

Nor is this attitude uncommon. It is fostered by popular books, by the incredible phenomena of the comic strips, by the reporters of science (even the good ones) and, worst of all, by some elementary college courses in science. The greatest achievement of a good survey course should be the development of a skeptical frame of mind toward the marvels, wonders, and miracles which crowd the paper. This is not to be simply Philistine; there *are* wonders and marvels, though perhaps not every day. No one who saw the New Mexico desert night burst into brilliance will admit that the age of wonders is past. But that was wonderful most of all to those who understood. To the casual witness it was a bright light low in the sky. To the popularizer it is a vulgar miracle. What is needed is the cultivation of that understanding and that experience which will make the graduate of a college appreciate the growth of science and enthuse over the great things that will come. But it is the "gee-whiz" air of naïve delight over the trivial and the misunderstood that is to be shunned.

There are related qualities to this one in the complete scientific understanding. All scientists, East or West, students of shellfish or of stars, are united in their belief of the universality of the objects they study. The neutrons, someone remarked, are neither American nor Russian. Neither is the understanding of them. A college course in science should lead to that feeling. On the whole the college student of today does share that belief. It is one of the hopes for the years to come. Science deals, again, with novelty. The appreciation of change, how it comes about, and what it means, is intrinsic to scientific understanding.

One of the most characteristic experiences in the laboratory is to come sharply against some detail of technique which, failing, spoils the experiment. It is common sense that for want of a horseshoe nail, a kingdom can be lost. In the laboratory and at the desk of the theorist are found the most frequent and clearest examples of this unhappy chain. An appreciation of the importance of often tedious and apparently trivial actions is quickly got in the chemical or the physical laboratory. The high vacuum worker knows as do few people, what cleanliness means. The meticulous attention and care which alone bring results of high precision are chastening. There are not many experiments in which accuracy to a few parts in ten thousand is sought, which will not enlarge the understanding of even the simplest physical measurement. The difficulty of fixing your attention upon one part of the physical world and neglecting the rest becomes greater and greater as precision is increased. To give the crudest of examples: measuring a distance certainly does not involve a thermometer. But measuring the length of a brass bar to one part in ten thousand does require it, to correct for the thermal expansion. It

is just this kind of insight which the survey laboratory or the general course is likely to leave out.

Nothing is more absurd than to believe that science is but a collection of skillful techniques employed by painstaking workers, but nothing is more unscientific than to fail to see the need for skill and for care. The design and carrying out of an experiment, from the first idea based on an understanding of principle, through the development of method and techniques, the final design of the detailed means needed for the work, the building and procurement of the needed devices, the tests which establish the correctness of the conditions, and the final experiment is uniquely good training. It is by no means unusual — indeed, it is rather the rule in modern physics — that the preparation of an experiment will take months and its actual execution be a matter of few successful runs of a few hours each. Appreciation of this sort of effort, characteristic of science and of much other creative work, from bridge building to novel writing, is an important objective of college science.

The explicit reasoning methods of science, too, are of general concern. The importance of mathematics, that is, of numerical measurement and logical thought, is well recognized in all courses of science. Not so well recognized but equally important, part of the substance of all scientific understanding, is the role of illogic. By this of course I do not mean error, but the appreciation of change, of contradiction and paradox, of doubt and its resolution. Any growing science grows only while it remembers these things. The world is not so simple as our logical accounts of it are. Professor Niels Bohr of Copenhagen is fond of telling what he calls "a little joke." It is a pair of definitions. If the opposite of a statement, its contradiction, is obviously false, he says, then the statement is true, but trivial; if the contradiction is also true, then the statement — and its contradiction — are *profound* truths. It is in this line of thought that the superficial as well as the thorough but routine approach to science are equally lacking. Whether the philosophy implied here need explicitly occur in any college course in science, I do not know, but that the point of view it represents needs exposition I am convinced.

The kind of training which would include such an outlook would satisfy another traditional requirement of science, the freedom from superstition. Whether in the most vulgar shape of the astrology magazines and the lucky ring or in the more sophisticated form of the medical panaceas and the psychological fads it is a latent danger. In the war years the growth of astrology in Germany was rapid; it had become an escape and a justification. It is not less than tragic that one of the best German nuclear physicists, a cynical Nazi but a brilliant man, seriously attempted to rationalize astrological notions with modern science. Hand in hand with this question goes the problem of tolerance in science. No walk of life is in general more tolerant of persons: any nationality, any race, any creed, any personal eccentricity can be forgiven a man who is a good worker in science. Even the deepest prejudices can be forgotten. This tolerance is one of the proudest customs of the scientist, and one born of necessity no less than tradition. But at the same time science is intolerant of wrong ideas. They are permitted no foothold, they are subject to polemic and disproof, to public and close examination. Here too is a way of thinking that needs the widest audience.

But science is not only a body of knowledge and a methodology for obtaining it. Science is an institution, a part of society. Here is perhaps the greatest gap in our present scientific curricula; there is hardly a campus where a genuine course in the sociology of science is given. Yet it is fully as important an institution as the joint-stock scheme. The work of research is never directly productive; how, then, does the scientist derive support in our society? In other societies? The examination of such simple questions as how many research workers there are, for whom they work, how their efforts are supported is left undone, or to an occasional article in *Science*. The history of this problem is filled with the most spectacular changes. Everyone knows how chemistry became

great in America after the end of World War I, but the story of what happened and why is not taught anywhere. World War II brought us in the last few years the most striking changes in the work of academic scientists. The organization of large laboratories for the solving of problems in a whole field of work, like the radar laboratory at Massachusetts Institute of Technology and the several large laboratories of the Manhattan Project, turned out at least in wartime to be mildly successful. The scheme of organization and the whole method of work was rather new to university workers, but by no means so novel to scientists in industry. Much research in this country is done in the laboratories of the great industrial concerns; some, also, is carried out by cooperative foundations representing an industry, more or less like the National Advisory Committee on Aeronautics. But the interrelation of such work is an untaught subject. Even for the question of vocational guidance for scientists, such instruction would be useful. But when the world can be influenced by research so dramatically and radically as atomic energy has shown, it is essential to a clear understanding of that world that the position of science in society be an explicit object of study. Few are the economists who can distinguish development from research, or both from design. Even the best of engineering curricula do not include a general self-conscious examination of such problems. The national life reflects this same rather curious lack of examination of an important problem. The necessity of scientific research is recognized, but no federal agency now supports outside research on any scale except the Army and the Navy. The lesson of wartime, that research could be of great use to the nation, was learned only by the armed forces. Much federal money is now going into weapons, much into nonmilitary research under military auspices. But is war the only justification for science?

The examination of the traditions of science is also worthwhile and neglected. How has the spirit of international scientific collaboration managed to withstand the shock of war? What has led science to be so little national, to recognize great men everywhere, to maintain pride in national achievement without much prejudice against the foreign successes? And has this point of view been healthy for the ends of science themselves? The natural sciences have a catholicity beyond the other branches of learning. No physicist is up to date who does not have some idea of what Professor Bhabha is doing in Calcutta, Schönberg in Brazil, Kapitza in Moscow, Amaldi in Rome, and — once upon a time — Yukawa in Kyoto. Few historians or sociologists have so wide a current acquaintanceship. This is worth something. The world community of co-workers and drinking companions and gossipers which nuclear physicists formed (they are surely only a single example among many) will be one of the forces against the return of chaos. And the development of a similar spirit, or even the frank account of what it was like, belongs in the curriculum.

The problem is not all on one side. Just as science has much to offer the campus which is beyond the weighing of reagents or the solving of problems in statics, so has the campus at large much which should creep or even be thrust into the laboratory. In nuclear physics today a good many physicists are troubled by a problem which every text on political philosophy or political science or ethics has treated for a very long time. It is a problem which they have because they are first of all men and then physicists, but which moreover is pressed on them by the progress of physics itself. It is the dilemma of freedom or planning. Physics today takes a great deal of money and many coordinated workers, if the great machines now so much counted upon are to be built and operated. But the progress of the science has, like that of so many sciences, depended upon the free and independent work of a large number of individual workers or small partnerships, not coordinated except through a common goal. Progress will demand both. How can these contradictory organizations be reconciled? The question is not abstract today; it is at hand. It will work out somehow, by common sense and plenty of muddling. It would be

much better if the similar experience, say of astronomers, and the general nature of the problem as a historical one were a little more an integral part of the training of physicists.

The growth of the educational and quasi-political organization of physical scientists, the Federation of American Scientists, has been an index of the recent concern of scientists with the consequences of their work. The problem of the responsibility of the scientist for the social utilization of his discoveries is not a new one, but it has gained new emphasis. More than ever the connection between the scientist and the people has to be recognized. The self-assured justification of science, that knowledge is always good in the long run, remains true; but the number of those who are skeptical is growing. It is up to the scientist to show that his faith is sound. The college and the college community are the places to begin. Every department of science should make it part of its work to see that more people understand science in the first place, and those more general implications of the work of the scientist that have been mentioned, after that. Public lectures are the easiest; a general willingness to participate as scientists in the intellectual and the political life of the community is the harder step.

The opportunity today is great. The colleges are filled with men and women bent on serious work. The prestige of science has never been so high. The work of the war years has left the research man with a store of worldly experience and with subject matter of spectacular and vital importance. It will be a poor college indeed whose science does not enlarge itself.

It is the enlargement of science which is the responsibility of science in the colleges and universities this year of peace and the atom bomb — enlargement simply by letting more people in on it, enlargement by letting it grow to touch fields it has so far academically avoided, enlargement by recognizing that to science must be added the thought of philosophers and of the students of the society in which science lives. How this can be done in the crowded halls of today's campus is not clear; but it is a challenge to try. The science which assumes these larger tasks must remain patient and clear; but it cannot remain neutral. It has to be against antiscience, against narrowness, superstition, prejudice, waste, and war. It must learn to be more self-conscious, to see how science has grown and why, and what could stop its growth. All these things ought to be taught and taught well.

David Lilienthal of the Atomic Energy Commission spoke to the American Chemical Society not long ago. He said there: "The diffusion of knowledge is the diffusion of power." The power which science has won today must be spread, and it can only be spread by teaching, by spreading the knowledge of science. If the ideas and the ends of the scientist are understood by the people, the growth of knowledge can bring only its classic benefits. If science withdraws, remains narrow and special, fails to see its place in society, teaches only its devotees, the growth of knowledge will threaten us all. With danger to men, there is danger to science itself. For science is but one of the rich activities of man.

The Social Science Units of the Northwestern University Liberal Arts Program

BY MELVILLE J. HERSKOVITS

IN MARCH, 1944, the faculty of the College of Liberal Arts, Northwestern University, by a vote of more than six to one, adopted a new curriculum that was thereafter to lead to the degree of bachelor of arts. At Northwestern, just as at many other institutions, the previous years had witnessed questioning of the elective system, exploration of the need for greater integration in undergraduate work, and tentatives toward revision of existing programs of study. Northwestern was one of the last universities in the United States to retain a requirement of Greek or Latin and mathematics as necessary for the B.A. Fewer students came to elect Latin and Greek and thus become candidates for the bachelor of arts degree, so that even students whose major interests were in the humanities were in the main being graduated with the degree of bachelor of science. These facts were an added stimulus in making apparent the need for a thorough reconsideration of offerings.

First steps in developing the new program were taken when a group of faculty members was called together to discuss the problem. At the instance of this group, the president of the university was asked to appoint an *ad hoc* committee to explore possibilities, and to present proposals based on the discussion that had taken place, so that, after due consideration, these might be laid before the faculty as a whole. A committee of four, shortly to be reduced to three through the illness of one member, was set up, composed of J. W. Buchanan (zoology, originally chairman, but who was able to participate only in preliminary discussions), Bergen Evans (English), G. Donald Hudson (geography, chairman) and M. J. Herskovits (anthropology). After a month's work, this committee reported back to the original group, outlining a four-year curriculum that was accepted substantially in the form submitted.

A three-week period of intensive discussion followed. Mimeographed copies of the proposed program of studies were placed in the hands of all members of the college faculty. Meetings were held at which the committee as a whole, or one of its members, met with divisional and departmental groups, while many personal discussions with individual faculty members who wished still further clarification, or had suggestions for revision, or who envisaged problems of administration or teaching not foreseen by the committee were carried on over the luncheon table or in offices. When the faculty was asked formally to pass on the program, it was by this time thoroughly apprised of what was under consideration. The lively debate that ensued was informed, and the final vote represented the considered opinion of the unusually large group that attended the meeting.

The philosophy underlying the program can best be indicated by quoting from the first pages of the special announcement issued to inform candidates for admission to the College of Liberal Arts as to its nature and scope:

It is the responsibility of a college of liberal arts to pro-

vide the student with an opportunity to learn to understand himself and the society in which he lives to the end that he may take his place in that society as an informed and intelligent citizen. Since modern society is composed of many interrelated elements, the preparation of the student should be broad and integrated rather than specialized and disparate.

The program presented here is designed to acquaint students with the disciplines that, in science, have enabled us to achieve a high degree of adaptation to our environment and to utilize the resources of the earth to our advantage. It seeks to give the student the basis for forming realistic judgments on situations with which he is likely to be confronted. And it hopes to acquaint those who follow it with an understanding of their own and man's place in the universe, to show them the historic development of our social institutions, and to equip them to share the aesthetic experiences of mankind.

In recent years, the demands of professional training have intruded so far into programs of study in the liberal arts that colleges are in danger of producing narrow specialists, naïve outside their restricted fields. The doctor who knows nothing but medicine, the technician whose concern is only with his special skills, the businessman unmindful of larger economic and social issues are not only poor citizens but inadequate human beings. The specialist will be a better specialist as well as a better man if he can see his work in its larger significances.[1]

The objectives of the program are also set forth in the introductory section of this bulletin:

This program is designed to serve those purposes which have historically distinguished the liberally trained man from the specialist or the illiterate. This curriculum is pointed toward the development of the individual and his separate powers and capacities. Through this study the student should attain a philosophy of life, a set of values by which to judge conduct, and he should gain both a vision of perfection and an intellectual curiosity which will influence his whole life. Through his study of the experience of humanity in the past, the student should learn to live more intelligently in the present and to aid more wisely in shaping the future of civilization and of society.

The point of view of this curriculum is based on the assumption that truth is dynamic; that it develops forms in one generation and for one people which it does not have at other times or in other places. The curriculum attempts to take into full account, therefore, what is set forth in the bulletin as the "Three Great Divisions of Knowledge," in giving the student a liberal education which will permit him to face and understand the problems he will meet in the present-day world. The divisions of knowledge in terms of which the work is planned correspond to the divisions into which the disciplines represented in the college are organized. These are (1) the physical and natural sciences, (2) the social sciences, and (3) the humanities. It is recognized that, however broad their training program, students will inevitably have differing interests which they will wish to satisfy. Although the course of study assumes a common base for higher education, yet it allows increasing opportunities for the exercise of choice by the upperclass student that he may develop his potentialities in accordance with what most appeals to him.

The following diagram, essential for a comprehension of the program as a whole, or of any parts of it, indicates the units into which the curriculum is divided.

Certain principles which are operative in shaping the new curriculum become apparent when this diagram is consulted. They are:

1. A close integration of the four years' work.
2. A rejection of acceleration, on the grounds that, in education, "a rapid growth is likely to be a pulpy one."
3. Opportunity for election, which increases as the student gains experience in the academic setting (*i.e.*, he elects only a language the first year, a laboratory science and language the second, while more than half of his work in the third and fourth years is in elected courses).
4. An insistence that general studies be followed by more specialized work; hence each general unit or series of units precedes study of a single discipline in the general field (*i.e.*, Introduction to Science is followed by a course in a physical or biological science or in mathematics; the social science units are followed by work in a social science or philosophy).

It is continuously impressed on the students that the aim of study is to get an education to fit them for living in later years, not, as one wit has put it

[1] "A New Program in the Liberal Arts," *Northwestern University Bulletin*, vol. xii, no. 33 (June 12, 1944), pp. 5-6.

(COMPREHENSIVE EXAMINATION)

FOURTH YEAR

Tutorial correlative reading 13	Work in a field of special interest 14	Work in a field of special interest 15	Special problem or area study 16

THIRD YEAR

Music Graphic and plastic arts Philosophy 9	Work in a field of special interest 10	A unit elected outside the field of special interest 11	A social science; or philosophy 12

SECOND YEAR

Literature 5	A modern foreign or a classical language (cont'd) 6	A physical or biological science; or mathematics 7	Modern Society 8

FIRST YEAR

The Use of English 1	A modern foreign or a classical language The Nature of Language 2	Introduction to Science Mathematics 3	The Bases of Social Life 4

in characterizing much of American higher education, to "swap points for a degree." If some subject intrigues them enough so they wish to spend a summer at the university or elsewhere studying it — and a number of them have done this — they study on their own time. As long as they follow the bachelor of arts program, they cannot "count" this toward anything — anything, that is, except their own education, and the development of their own interests. They are given lists of books they might profitably read — for themselves again, not for a course — during the summer, and they do a considerable amount of reading as a result. They discuss with faculty members plans to take jobs that will bring them in contact with people, and are aided in getting the kind of experience they seek.

This pattern of relationship between faculty and students arises from the fact that so much of the teaching in the first two years is done through teamwork. Students have no single figure on whom they can focus the suspicion that he is there to trip them in their quest for a grade. They know the teaching group as a whole prepare their quizzes, but they have no way of knowing what member of the group has graded their papers. Faculty-student relationships thus tend to be on a different level from what is ordinarily found. Students seek advice when they have problems of an intellectual or personal nature; "advising" is not

a matter of recommending which courses out of the bewildering variety of the elective curriculum a student may take — advice given in a fifteen-minute session at the beginning of each quarter. Advice is asked, as in later life, from a trusted friend, when there is a matter of moment which the student feels his own capacities are not sufficient to solve.

The students who enter this program, it should be pointed out, are not selected except in so far as the University Admissions Office selects candidates for admission to the university. Any student who is admitted to the College of Liberal Arts, that is, may elect the bachelor of arts program. Beginning in 1945, a modified form of the program, preserving its essential characters and employing three-fourths of its units was worked out by the faculty of the School of Education. This program retains work in English and the humanities, in the social sciences and exact and natural sciences, but substitutes courses in education for the languages. Aside from these exceptions, the students who follow it take the same courses as the B.A. students, and form one class. It leads to the degree of bachelor of education, and is required of all candidates for that degree. The first year's freshmen group numbered 104, the second 161, the third 186. Students drop out for various reasons, but it is expected that between 30 and 40 percent of the first entering class will be graduated. It is to be noted that no student can enter the program save as a beginning freshman. The program has only one entrance, though the exits are as numerous as in any conventional course of study.

We turn now to the social science units, The Bases of Social Life (Unit 4) and Modern Society (Unit 2), which are taken in the freshman and sophomore years, and with which this article is primarily concerned. Both these courses are taught cooperatively by groups of faculty members. Some of the methods that are employed have been borrowed, in a modified form, from techniques developed when, during the late war, at the instance of the Provost Marshal General, United States Army, a training program for prospective civil affairs officers was set up by the university. In this project a group of men, forced to revise radically their previous teaching methods, formed a team in which specialities were pooled and pointed toward a single objective — the civilization of Germany, and later, of Japan. A spirit of give-and-take was developed in the process of listening to, and criticizing, one another's lectures. This proved invaluable as a model, when some of the same group were called on to participate in the social science units in the bachelor of arts program.

The aims of the two units can again best be presented by quotation from the bulletin. The first is described as follows:

THE BASES OF SOCIAL LIFE

To understand the life he lives and the world he lives in, a member of our society must comprehend the forces to which all societies have to adjust themselves; the range of human institutions, of which our society is but a single expression; and the roots of our system of values, our beliefs, and our accepted modes of behavior. Toward such a comprehension the student is given, in his first year, a body of the fundamental information and a grasp of the methods of analysis he must have if his world is to be made understandable to him. He is taught, as a part of a unified approach, the role of his natural environment; he is made cognizant of the psychological forces that lie at the base of human behavior; he studies the variety of institutions, customs, and beliefs that make for the adjustment of human groups to the world in which they live, and the development of human cultures in prehistoric and earlier historic times. To give him perspective in his view of the historical development of our own society, his attention is directed toward the chief characteristics of the great civilizations of antiquity, and the Medieval and Renaissance periods of European history.

The second unit in social science has these aims:

MODERN SOCIETY

Continuing the work begun in "The Bases of Social Life," this unit studies the modern world, starting with the drives which peopled the New World, destroyed the provincialism of Western Europe, and brought the Americas to their contemporary importance. With this background, the student, through reading and observation, is introduced to the economic, social, and political forces that shape modern society. He is shown the structure of our industrial, technological society, the organization and operation of markets, and the function of the science of economics. He begins to analyze the complexity of the social structures in a great society,

to investigate their adequacy, and to see how they reflect contemporary conditions in other aspects of our culture. He observes how systems of government resolve conflicting aspirations and direct their attainment, and explores the role of government in fashioning a peaceful world.

In general, classes in both first- and second-year social science units meet for three lectures and one discussion section a week — though no hard-and-fast rule governs this. Rather the discussion groups, which are neither regarded as quiz sections nor conducted like them, are in the main spaced in the logical places for discussion of the materials of related lectures. The faculty members and assistants who teach the course attend the lectures. This has had an appreciable effect on the quality of the presentations. As one participant observed, "It is one thing to lecture to 150 freshmen, but something quite different to lecture to 150 freshmen and six or seven colleagues!"

The size of the discussion sections varies from fifteen to twenty students; some have had as few as twelve. Though the leaders informally agree upon the principal points from lectures that should be treated on a given day, no attempt is made to force discussion into any particular mold. If the interests of a group take it elsewhere, discussion is permitted to follow a different course than was envisaged. Thus lectures on Greek colonization may lead through the problem of what the term "colonization" means to an analysis of the difference between colonization and imperial rule, and that, in turn, to the problem of dependent territories in the present-day world.

A student has a different discussion leader each quarter. This is done because it is recognized that a faculty member will inevitably see and discuss problems in terms of his special field. The practice of changing discussion section leaders has thus proved of great educational value. In his first year the student may have a philosopher, a political scientist, and an anthropologist as leader of his discussion section; in his second, an economist, an historian, and a sociologist. The differences between the several disciplines represented, though they are consistently submerged in the attack on the common educational objective, thus are used to give the student an idea of how men in different fields observe the same phenomena from different points of view.

Students are told explicitly, in the first session of their freshman year, that such matters as attendance at class sessions are their own concern. At the same time it is made plain to them that, "though you are not required to attend any of these meetings, you will be responsible for what is said," as the mimeographed sheet handed each student at the initial meeting puts it. "You are primarily responsible for your own education and should realize this from the first." For the record, a count of heads is kept, and it is interesting to note that attendance at lectures varies between 90 and 95 percent, while absence from discussion groups is even less. Quizzes become less frequent as the students accustom themselves to the spirit of the course. An examination is given at the end of each quarter, but grades are provisional, the final mark being awarded on the basis of the entire year's work. However, no opportunity is lost to stress the point of view that quizzes and examinations present the student an opportunity as well as constitute a challenge.

One technique that has been found to be effective is to hold periodic "resumé" sessions where the entire class meets for general discussion. Experience has shown that it is better to ask for written questions in advance, rather than to defer them to the morning of the discussion meeting. The students submit many requests for clarification on points that have puzzled them, and the committee members and, where possible, lecturers drawn from outside the committee — though these are relatively few — whose lectures are under review, are on hand to answer. At times, controversy develops between faculty members. This is utilized for its educational worth, in demonstrating how differing points of view on the same matter can be advanced and argued. Needless to say, the stronger the disagreement, the greater the delight of the students. At times, too, an *ad hoc* question will trip an unwary lecturer. The students are told

that this is something they may anticipate, and that in the give and take of intellectual discussion, position and age give way to cogency, logic, and the facts. In short, the spirit of integrity and scholarship is held up as an ideal to be observed in practice as well as theory.

There is no tendency to talk down to the students. Rather, lectures are given as before any audience. For the first few weeks of the first quarter in the freshman year some students experience difficulty in orienting themselves to this new kind of instruction, but they rapidly adjust themselves to the rather sophisticated presentations to which they are submitted. To aid them in understanding and digesting the lectures, they are provided outlines, which the lecturer has prepared and which he is expected to follow and complete. This is not always observed, but the questions of the students in discussion are invariably directed toward finding out what was omitted or disregarded. This pressure soon brings a lecturer the realization that it is his job to keep to the contract implied when he drew up his outline — that he will actually talk about the subjects he has set down, and in the order given, so that student notebooks will contain materials in line with the mimeographed sheet opposite a given set of notes.

The content of the two units was hammered out during the many meetings of the faculty personnel charged with conducting them. Since Units 4 and 8 are conceived as a single element in the program, the committee concerned with them meets as a whole when the course-content of either is under consideration. Unit 4 was worked out during the spring and summer of 1944, Unit 8 the following academic year. This committee includes men from all social science departments of the college, and from the School of Education. The affiliation of the chairmen of the subcommittees which conduct the two units, for the three years the program has been taught, is as follows: first year, Unit 4, M. J. Herskovits (anthropology); second year, Unit 4, B. Morris (philosophy) and Unit 8, F. D. Scott (history); third year, Unit 4, J. Park (education) and Unit 8, G. J. Cady (economics). Meetings of the committee to revise the offerings are now held during the spring quarter. They are preceded by notices sent to the social science departments, who are asked to suggest changes they feel should be made in current presentations. During the initial discussions, especially as to the character of Unit 8, however, conferences were held at which several of these departments as such, and individual members of others, contributed their ideas regarding the manner in which The Modern World should be treated.

In essence, the plan that has eventuated from all these meetings has been to present The Bases of Social Life on an historical framework, Modern Society in terms of some of its more pressing problems. This does not mean, however, that the first year's work is a history course. Emphasis is on concept and process and relationship. The historical terms of reference permit the student to approach the problem of the nature and functioning of human society from this point of view, but at the same time afford him a sense of time-depth and give him knowledge of the background of the culture in which he lives. The civilizations studied, that is, are regarded as "cases" in an historical setting. The tendency in committee discussions has been to revise offerings so as to lessen emphasis on our own culture and broaden the geographical scope of the societies treated.

The following statement, given the student at the outset of his first year's work, makes the approach to the materials clear.

> During the year you will study many ideas from many ages. Although the sequence of the material will be roughly chronological, chronology will play a relatively minor role. In general the course is organized in a manner which draws attention to all the major phases of social life and shows their integral interrelationship. Three tools of analysis will be used to analyze various civilizations: a study of the environment, of man in social groups, and of the distinctive qualities of each culture. In working toward an understanding of the civilizations from Egypt to 1947, it will help you to keep a few questions constantly in mind:
>
> 1. What was the natural environment in which these groups lived?
> 2. What were their racial affiliations?

3. What was the nature and chronology of their developments?
4. What were the relationships between the various civilizations?
5. What patterns of change can be found in each of these cultures?
6. What were the outstanding characteristics of their institutions?
7. What were the principal values that influenced the ways of life and the thinking of members of each of these civilizations?
8. What was unique in each culture?
9. What has been the contribution of these cultures to our own?

After the introductory session the beginnings of civilization in prehistoric times are discussed, then in turn the cultures of Egypt, Crete, Greece, Rome, Mediaeval and Renaissance Europe, and the Age of Enlightenment. The three final weeks of the course are used to bring together these materials, as is to be seen from the concluding section of the outline:

A. Heritage of the historic cultures.
B. Intellectual tools for understanding human society.
   1. Cultural patterns and cultural change.
   2. Can cultures be evaluated?
   3. Human institutions and their conflict.
   4. Revolution as a means of change.
C. Basic conflicts of the modern world.

Each culture in the succession of those treated is considered in terms of the light it throws on certain problems in the study of human social life. Thus in discussing Egypt, the students are introduced to the Veblenian concept of conspicuous consumption, through expenditures resulting on the presence of an economic surplus, in this case illustrated by the pyramids and other monumental structures erected by the Egyptian monarchy and religious hierarchy. At this time, too, the role of the natural setting in influencing culture is analyzed. The problem of Greek democracy in the classical period is posed in terms of a society composed not only of the free citizens but also slaves and noncitizen freemen. The development of Christianity out of the mystery cults of the East, out of Judaism, and out of the socio-political situation of the Roman Empire invites a discussion of the processes of acculturation and institutionalization in the development of systems of belief. The world view of the Middle Ages, in terms of its resulting social stratification and suppression of individualism, offers the opportunity for a consideration of the philosophical problems raised in contrasting the implications of this approach to reality with that prevalent during the Renaissance. When the expansion of Europe is considered, the cultures of some of the peoples with whom Europeans first began to come into contact are described in lectures on China, India, native Africa, and the Inca empire of Peru.

At the outset of his second year of social science, the student is again informed what he may expect in the discussion of Modern Society, and given an outline of the topics to be studied. This plan can best be described in the statement that he receives at the opening session of the course:

> During the fall quarter, the characteristics of modern society and its development in historical perspective will be considered. Specifically, the topics will center around crises in the modern world such as the American and French Revolutions; the Industrial Revolution; nationalism; the expansion of Europe; and finally, the outstanding characteristics of twentieth century life. In each case the lectures are designed to give you a factual knowledge of our recent past, in order that you may understand the character and the motivating forces of the present.
>
> Against this background of knowledge, during the winter quarter you will survey some of the outstanding problems of the modern world: the causes of war and their possible elimination; international organization; and the chief economic problems associated with capitalism and modern industrialism, as well as some of the alternative solutions to these problems.
>
> Following this, through the remainder of the winter quarter and the entire spring quarter, the study of some of these outstanding problems will be continued. Urban life and its complexities; the individual and his adjustment to modern life; the problem of democracy and what it means in economic, social, and political terms: these will be the main topics for our consideration. As citizens you will be concerned with democracy as a way of life, and in what manner democracy can be made most effective for all.

In the outline of the course, the problems are posed as questions, in this manner: "How can we build a peaceful world society?" or "Why are we

living so far below our technological potentialities?" In considering the various problems, every effort is made to give the students a realistic sense of the complexities which face one who would understand them and seek for solutions to them. War, for example, is analyzed not only in its political and economic aspects, but also as a psychological and historical phenomenon. The effect of population pressure is discussed by a specialist in demography; the resources of the School of Journalism are called on to provide an exposition of the role of the press in the causes and cures of war. In the discussion sections, and in the general resumé sessions, clashes of opinion occur among the students themselves. For by the middle of the second year the group, having studied the same subjects and argued the same topics together for this long, are well integrated, and can carry on vigorous discussion on an intellectual level. Much of the timidity that acts to dampen discussion in large classes conducted under the elective system tends to disappear.

A word may be said concerning collateral readings. These are indicated on the outline for each lecture or group of lectures. The students are held for those marked "required," and encouraged to explore those indicated as "recommended." The problem of readings, however, is a difficult one. It is anything but simple to ferret out specific papers that bear on a given topic as it is set in the particular approach of these units. Textbooks have been tried, but have not proved too satisfactory. Whether the committee will itself have to develop a textbook or readings, combining materials already available that are pertinent, with specially written sections on topics for which readings cannot be found, is under consideration. In the meantime, the lecture outlines, in a very real sense, make up the syllabus of each course.

That the training the students receive in the social science units takes them well into the materials of the several disciplines as conventionally taught in introductory courses is apparent even from the brief experience of one quarter with the initial class, now beginning its junior year. Unit 12, it will be recalled, requires work in a social science. In some departments where students in the bachelor of arts program have been taking second- and even third-line courses, they have done the work without difficulty. In these departments, where they elected or were directed to an "A" or beginning social science course, they have felt it to be too elementary. "It was a good review of some of the things we had our freshman year," one of them said.

This would seem to indicate that the integrated approach of the first two years gives the students a background that, in their junior and senior years, will stand them in good stead in their social science courses. From the broader and more important point of view of the objectives of the program, however, it would seem to permit the hope that these units, together with the work in other fields with which they are interrelated, will perform their task of equipping students after graduation with adequate resources on which they can draw in functioning as informed citizens in a democratic society.

*A Pattern of General Education in Technical Institutes**

BY L. L. JARVIE

IT IS a statistical fact that 60 percent or more of the high school graduates in the state of New York do not seek further formal education. Beyond the high school, then, this large group of youth may be assumed to continue their education informally with no particular key of direction or aid. Their education and growth becomes dependent upon normal living experiences interpreted from a base of continued maturation. It is natural to raise the question of why this 60 percent or more of high school graduates abandon a planned program of preparation for living.

Many answers to the "why" may be obtained through study and research. The most frequent explanation is lack of economic resources, frequently coupled with geographic inaccessibility of opportunities for further education. A less tangible solution to the "why" can be found in the fact that the high school graduate cannot find the type of program which he believes will be of greatest value to him as he plans his future. Unless he enters college and ultimately moves into one of the professional schools, there is no alternative except to enter the work world directly from high school. All of this implies the need for constant exploration and experimentation to discover programs which will more adequately meet the needs of youth and of society in general.

Such exploration and experimentation has led, through research and legislative action, to the establishment of five Institutes of Applied Arts and Sciences in New York State. This new undertaking will aid in meeting the increasing educational needs of the youth of the state, and at the same time will assure a continuing supply of technicians for business and industry. The creation of a state system of Institutes of Applied Arts and Sciences, embodying education for living a life and earning a living, is a result of the efforts of the state to offer constantly expanding opportunities to youth and the growing demands of a technological society. In looking at the objectives of the new institutes it is necessary to recognize that the basic motivation for instruction is derived from the concept of preparing individuals for technical positions in various types of industry. Granting that this motivation appears highly materialistic, it does not follow that there can be no concern with experiences which enable the student to live beyond the mere orbit of a job. Institutes are just as greatly concerned with the preparation of students for a total life as is any other type of educational institution. They really only give recognition to the fact that an extremely important aspect of living an effective life is that of earning a living. It may be said then that the purpose of the institutes is to produce a person with a foundation upon which he can build a life in which economic effectiveness plays an important role in that it contributes to the total effectiveness of the citizen in modern society.

This philosophy, which endeavors to synthesize the needs of society for an educational program to

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help young men and women make positive contributions as citizens and workers, and the needs of individuals for better total living, comes at a time when post-secondary education is at the crossroads. Since the early part of the century the junior college movement has been seeking a pattern of educational opportunity to serve these youth whose plans for continued education are not wholly met by colleges and universities. This movement has been gathering momentum in two channels. Under the historical influence of the liberal arts curriculum, much of junior college education has paralleled the first two years of college, or has provided preparation for more education in various professional fields. Under the more immediate pressure of a society largely characterized by technological change, increasing numbers of schools are offering thirteenth- and fourteenth-year curricula leading directly to occupational competence and employment in technical positions. Both of these phases of the junior college movement are strong. Both will grow in numerical strength under the gradually rising age level for initial employment.

But there is a third and more comprehensive solution to this problem of a satisfactory pattern of two-year terminal education beyond the high school. This design recognizes that the liberal subjects take on occupational significance in community living, and the technical subjects provide a freedom of action resulting from occupational competency.

The latter pattern then indicates a need for curricula in which all experiences have relevancy to the daily and far-reaching problems of effective and satisfactory living. To achieve this end, emphasis must be placed upon practical application and interpretation of knowledge and experience. In the institutes students will be aided in developing a foundation upon which to build a comprehensive understanding of citizenship in action. At the same time they will achieve mastery of certain skills and knowledge essential to beginning job competency in particular technical fields. However, technical preparation must go beyond specific skills to the achievement of a broad base of technical understanding necessary for continued growth and development on the job and consequent elevation to a position of greater responsibility within industry and the community. It is at this point that institutes differ from the trade school which is concerned primarily with the specific skills of a particular trade.

Throughout the period of research which led to legislative action the problem of coordinating technical and general education has been central in all planning. Too frequently unsound distinctions have been set up between the two areas. Some of them date from the Roman distinctions between the "liberal education" for free men and the vocational education for slaves. Others originate in the struggle of vocational educators to gain support for their work with the consequent distinctions between vocational and general courses in federal reimbursement for the support of vocational courses as contrasted with general courses in vocational schools. Still others spring from the contrasting of "general education" and "special education" as liberal arts colleges sought to provide advanced education for persons vocationally interested in fields other than the ministry or law or teaching.

The problem in liberal arts colleges in the past generation is indicative of the type of problem that must be faced in the Institutes. This problem in the colleges has been largely to guard against overspecialization in such subjects as chemistry, language, literature, or economics by establishing comprehensive general education programs. In the arguments set up, vocational education often was loosely classified as "special education." Unquestionably vocational and professional education have often been far too narrow and specialized; but the classification was not carefully examined.

Most arts colleges did not offer vocational education in the usual sense and they did not look carefully into it, for if they had they would have found great difference between the narrowness of specialization for academic mastery of the subject of chemistry, for instance, and the breadth of

knowledge and skill required for success in the vocation of industrial chemist. So also between the academic mastery of English and the preparation to be a journalist or a teacher of English. The modern conception of a vocation or profession is not limited to a set of special skills. It includes skills which every competent citizen should possess in addition to the special skills required for success in a particular field of work.

General education has been subject to similar vagaries of definition. The Board of Regents of the University of the State of New York in their quest for comprehensiveness in their basic proposal for technical institutes included three objectives: "basic preparation . . . general understanding and . . . liberal subjects." "Basic preparation" as basic education preparatory to study in law, medicine, or other professions has underlain the instructional program of many junior colleges and of the lower divisions of colleges and universities which they sought to parallel. "General understanding" is likewise exemplified in many junior colleges where studies are designed to provide *generally useful education* in a two-year terminal program. It is usually contrasted to highly specialized education. It is often conceived as a body of common information, experience, and skills including the occupational, which will give the "commonalty of culture" essential to citizenship. "Liberal subjects" suggests at least two meanings commonly used in contrasting junior college and liberal arts college curricula with those in vocational-technical education. The liberal subjects as interpreted by some spokesmen for education include mathematics and the revival of rhetoric, grammar, and logic after the pattern of the medieval trivium. The second meaning, and the one of positive concern to the regents, lies close to "generally useful" with emphasis on common cultural backgrounds.

As one practical step in carrying out the proposal of the Board of Regents for reinforcement of general and technical courses, suggested criteria for technical and general offerings were worked out in as closely parallel form as possible. Those for general education follow:

1. The curriculum should develop in students that level of general maturity needed by responsible workers and citizens in the community.

Maturity as workers should be based, first of all, on specific understanding of technical processes. These processes should be demonstrably related to the larger context of science and technology, and science and technology in turn should be related to social, economic, and political factors of the community.

Maturity as citizens should be based on this understanding as workers, plus adult experience with the varied activities of the community in the management of its affairs.

2. Specific traits to be developed should include adult competence in social and business relations, political awareness, understanding of technological advancement and change, skill in communication, and skills in maintaining and promoting personal, family, and community health and recreation.

Graduates should be able to perform satisfactorily such general activities as: applying intelligently for positions; securing personal or community services for themselves, their families, and the organizations to which they belong; handling family business and other organizational affairs; keeping abreast of new information about all these things.

3. Experience to be provided as general education should include studies and experiences in community life, both in relationship of science and technology to changing social and economic patterns, and in the responsibility of the individual in helping to direct this change.

Experience should include class activities and community functions which relate the responsibility of the individual to the community's maintenance of its health and safety, its provision of educational and recreational facilities, its provision for communication channels insuring to individuals and groups a democratic voice in community affairs.

4. Courses providing these experiences should be so titled that their main function is clear: Science and Technology; The Modern Community; Communication Skills; Personal and Community Health.

"Science and Technology" points to the broad context in which the major ideas and contributions of the special branches of science would be related to the individual's technical understanding.

"The Modern Community" as a title directs attention to interaction of social, economic, and political forces in the immediate community and in the larger national and international community as these factors affect the individual's occupational and social life.

"Communication Skills" calls up ideas of the development of skills essential to modern "two-way communication" involved in intelligent response to language, picture, color, and sound employed in various arts.

"Personal and Community Health" clearly points to practical knowledge and skills for the integration of private and public health concerns.

5. Community needs clearly point to the usefulness of these courses.

Public opinion surveys, studies in propaganda analysis, statistics on currently preferred forms of recreation, statistics on the stability of marriage relationships and on extent of voter participation in community affairs — these, plus the opinions of responsible people about the need for an informed, articulate membership in occupational organizations and the need to maintain effective communication between employing and working groups all provide points of reference in determining the community's need for general education on an adult level.

6. The institute programs should concentrate on essential instruction not readily available elsewhere on the level of maturity sought.

7. Continual study of community and vocational-technical needs should result in continual adaptation of courses to meet these needs.

In order to achieve a pattern compatible with the foregoing criteria the advantages and disadvantages of various general education patterns were studied with reference to needs and backgrounds of students, length of program, demands on staff, and the availability of suitable facilities and materials for instruction. These programs fall into three patterns: (1) groups of special subjects, (2) broad divisional or comprehensive general courses, (3) core programs.

Many variants on these typical programs were examined and other trial patterns which departed from them entirely were developed. Probably the most crucial consideration in the development of a workable pattern was the ability of teachers to work with it effectively. Some teachers are now being prepared to try out groups of related courses and broad field patterns. While few teachers are able singlehanded to offer comprehensive programs in natural sciences, social sciences, or humanities comparable to those of large universities with extraordinary resources of staff and equipment, large numbers of teachers are able to offer modifications of these programs fitted to the special needs of the Institutes. Fewer teachers have been prepared to teach in core programs. Ideally, such programs are probably the most desirable. But until considerable numbers of teachers are available, and until large bodies of up-to-date materials can be prepared and kept up to date, core programs offer a doubtful initial pattern for the Institutes.

Student interest was a hardly less crucial consideration. Programs need to have enough familiarity of pattern for students to feel at home in them. Yet they should have sufficient apparent difference and advancement from high school general science, social studies, and English that the program does not contain repetition. Sampling of student attitudes and interests in a survey of New York State Agricultural and Technical Institutes in 1945 showed strong resistance to generalized

science, social studies, and English courses in the high school pattern. There was responsiveness, however, to the development of general experiences around a series of related basic ideas.

In arriving at a pattern of general courses for the Institutes of Applied Arts and Sciences, administrative convenience as well as teacher qualifications and student interest was considered. The occupational purposes of the institutes would hardly seem to justify administrative divisions of natural sciences, social sciences, and humanities, any more than they would appear to justify highly generalized courses in these broad fields. But certain of the obvious educational values of the broad course pattern can be secured, along with values attaching to other frameworks. Where relatively few general courses can be offered in a two-year program, a modified broad course plus a clustering of related technical courses is a means of maintaining needed perspectives on the part of students, staff, and administrators.

Unification or linking of the technical and general courses is a major concern in the institutes. Administrative workableness, educational suitability, staff preparedness, and student interest all call for selected procedures and subpatterns for which not much helpful precedent can be found. Such linking calls for more than the usual "problems" approach, although such an approach can be useful if it does not reduce everything to a "problem" over which brows must be knit.

Students are interested in pivotal ideas — whether in victory through air power, or atomic fission, or slanting of symbols in advertising and propaganda. From high school they commonly bring a fairly wide range of miscellaneous information related to such ideas, but they have not pulled them together and considered them systematically for use. That is to say, they have had contact with folkways and folklore of communities but have not considered them as modern anthropologists do or as publicists do. They have been introduced to aspects of the "balance of nature" in connection with conservation of natural resources, but usually have not considered them as ecologists and human geographers do. They have had experience with aspects of communication in languages, art, music, radio, motion picture, but have not pulled them together as modern experts in communication do. Textbooks lag with reference to such ideas.

Working explicitly with *basic ideas* has the virtue at once of a demonstrably logical program and of an up-to-date spontaneous-interest program. One of its expressed purposes should be to keep students alert to new key ideas beyond their institute days — to recognize and test them, and to fit them into an orderly and usable pattern. Such a procedure can be reinforced variously by *historical, thematic, problems, operational, areas of living, and other, approaches* as circumstances warrant, without losing sight of the main aim of being informed of, and of being able to apply, the ideas that give shape to our world today.

From modern writings in science, social science, humanities, communications, and health, there has been prepared a short initial list of modern concepts which appear to be equally imperative for vocational-technical and general competence of workers and citizens in our rapidly evolving "one world." These concepts are viewed experimentally and only as a beginning attack on the problem of integrating general and technical education into a pattern of common education for a particular student.

A. Basic ideas in modern science and technology. Six concepts are the basis of much of our current thinking about national and international conservation of natural and human resources. These have been responsible for many new developments in our "world of new inventions and technical processes, new achievements in satisfaction of human wants, and new demands for competence in citizenship, home relationships, and community living" stressed in the regents' plan. They underlie the planning of such projects as TVA, our concerns for urban development, and proposals for decentralization. They are entering largely into determination of international political economy.

1. Science supports technology, and technology in turn fosters science. In the modern world

neither can be understood fully without the other, since the newest features of the one cannot exist without the other.

2. Increasing scientific perception of the interrelatedness of the phenomena of nature compels us to plan scientifically for the related development of human resources and natural resources — organic and inorganic.
3. Science has gained us new conceptions of available energy. Man has depleted or is depleting some sources of energy. Natural resources such as soil can be replenished. Through refinements of science and technology, resources not previously valuable become valuable. Research in nuclear physics and biochemistry gives promise of sources of vast energies which will be tapped as scientific research keeps pace with human need.
4. Scientific method in measurement and analysis is itself an essential resource, giving us not only means for meeting problems but the confidence that we can meet them. This method extends all the way from precise measurement and description of phenomena to the extension and testing of evolutionary thinking in fields not commonly thought of as scientific.
5. Science and technology are measurable resources for providing work, employment, and a higher standard of living.
6. Biological studies of human nature are essential in modern thinking about social organization, language and other forms of communication, and similarities and differences among cultural groups due to genetic factors.

B. Basic ideas in social science. Seven basic concepts are keys to much current thinking in the social sciences. They call for inquiry and demonstration in local, regional, national, and international community living.

1. Modern social science seeks to keep whole communities or societies in view in the manner of the cultural anthropologist, as well as to deal with social, political, and economic institutions separately.
2. The basis of every community is some form of marriage and family life in which the patterns of family relationship are generally consistent with the larger social pattern.
3. Economic well-being of the various members of a community is necessarily a matter of whole community concern. Technological productive skill has outstripped our skills in distribution and economic adjustment. Government, business management, and labor all have public responsibility for overcoming the lag. Labor-management relations are of concern to the whole community.
4. Health education and similar matters of social welfare are responsibilities of whole communities, to be provided for by enlightened legislation and public funds.
5. Ethics and law change to fit changes in social needs. Symbols and sanctions must often be consciously changed if a society is not to be at war within itself.
6. The older "police state" is giving way to a "social service state." No such change can be immediate, uniform, or wholly peaceful.
7. Technology has made man a world citizen, requiring that he think of communities and states on a new scale, with readjustments of structure and functions in the local, regional, national, and world communities.

C. Basic ideas in communication and communication arts. Seven basic concepts run through modern studies in institutes and agencies of communication research in the past ten years, and through modern studies of the Humanities. They animate our spokesmen in many fields: advertisers and other molders of public opinion.

1. Communication is a two-way symbolic process. Communication is not simply "communication to" but "communication with" another person or group of persons — using symbols that stand for ideas and things.
2. Human community depends on communi-

cation through symbols in the family, the neighborhood, the region and throughout the world. Man's ability to symbolize his experience and values in language and other forms of communication is the trait which most clearly differentiates him from other animals, and has enabled him to survive and develop. It both identifies him with and differentiates him from other men.

3. The variable interpretation of such symbols is the basis of much of our misunderstanding: Various language arts have been developed to secure more complete understandings: logic, rhetoric, grammar, propaganda analysis, semantics.
4. Symbols of various kinds reinforce one another in the communication of information, ideas, feelings, values. This is strikingly evident today in the revolutionary new combinations of language, music, color, picture, symbolic objects and symbolic actions, and in print, radio, movies, television, and pictorial graphics accompanying print.
5. Skill in the arts of communication is essential for individual development — for social competence, for intellectual growth, for personal resourcefulness. Language skill is the commonest of these, but many persons find more complete communication in other skills through other mediums.
6. New mediums and arts of mass communication are providing more of our common experience than print provides. At the same time they seem to tend toward stereotypes and the loss of individuality out of which creative effort springs, even while they have greatly widened horizons. (FM radio may provide some antidote with its limitations to a hundred mile range.)
7. New instruments and arts of communication now for the first time make possible world community, as well as much larger and more tightly integrated local community units.

D. Basic ideas in personal and community health. Two basic ideas bring into focus much of our current thinking about the physical and psychological health of "the person" as he lives in interaction with his family and community. They underlie the work of our child development centers and family counseling services, and of professional and lay people concerned with improving the public's health through dietetics, guidance clinics, medical care, and community recreational facilities.

1. The human organism is a physical-emotional-intellectual whole. What affects one part usually affects other parts.
2. Health has a social as well as an individual basis — in the family and in the larger community. Whatever affects one part usually affects other parts.

The proposed pattern and the obvious interplay of basic ideas in one field and another are designed to foster several kinds of coordination: (1) coordination among the applied general courses; (2) between general and technical courses; (3) between school activities and community activities. Through a series of coordinating conferences a means will be provided for discussing these relationships. The effectiveness of such a conference or any other device for coordination will turn on the thoughtfulness with which a staff studies the problems of coordination and experiments with means of aiding students to think in terms of relationships and the interaction of ideas in life.

The most obvious means is through common applications of learning to the community. The comprehensive general courses — Science and Technology, The Modern Community, Communication Skills, and Personal and Community Health — are designed to take full advantage of the fact that the institutes are regional institutes. They can seek general education in a more immediately applied context than is possible in a liberal arts college or technical school which draws students from many communities, which expects to return them to many communities, and hence must offer instruction on a more generalized level. This need not

mean provincialism. The Modern Community would deal with the local community in its region first but should reach out to the whole world community. So with Science and Technology and Communication Skills. In the technical courses, no less, the community application can move to the comprehensive application. The two kinds of courses can support one another without making forced correlations.

The modern conception of a vocation or profession is not limited to a set of special skills; it includes skills which every competent citizen should possess and other skills as well. The establishing of this conception of vocational-technical education should be reinforced throughout the program by guidance counselors and by staff in planning projects and class activities of community-wide application. America is a community of workers, not free men and slaves. Sound vocational education consists of both general and technical preparation. Any sound general education must include education for some vocation. The New York State Institutes of Applied Arts and Sciences have a unique opportunity to destroy the dichotomy between technical and general education. They are experimentally conceived and through thought, imagination, and initiative they can achieve a new pattern of education which will widen the opportunity of youth for further education beyond the high school.

The "Future" of the Humanities in General Education

BY I. A. RICHARDS

> Even in that certain hour before the fall,
> Unless men please they are not heard at all.
> *The Fabulists*

AMONG THE guests at the Conference on the Humanistic Tradition in the Century Ahead, which formed part of the Bicentennial Celebration at Princeton last fall, were men and women with good claim to speak with authority — and still more with responsibility — for their subject. The occasion was felt to be challenging. This conference had been preceded by one on nuclear physics and another on the social sciences; and the skilful planners of our program arranged that we should be aware of this. It was hardly possible throughout the discussion not to wonder where — in the balance of forces that are shaping the future — the humanities did come in. Latish in our deliberations, somebody, perhaps unkindly, said that we had been talking a lot about our traditions. He questioned whether the physicists or the social scientists had said much about their tradition. He thought they were more likely to have discussed their *programs*. The audience looked, it seemed to me, somewhat uncomfortable at that. But indeed all to whom the humanities matter may well feel uncomfortable — extremely uncomfortable, if not indeed distressed and alarmed — about what is happening and *not* happening in the humanities at present. And they matter — by definition as well as in fact — to every man, woman, or child who aspires to become or remain a human being.

The Conference on the Humanistic Tradition in the Century Ahead is one source of the following remarks. Another which should be mentioned is the course on Homer, the Old Testament and Plato as Sources of Our Common Thought which I am giving at the moment as part of the experiments under way at Harvard towards "General Education in a Free Society." The reflections thus prompted sum up to this. The antinomies focussed in that title are very far from being resolved, anywhere or by anyone, either in theory or in practice. Certainly reverence and regard for famous books and a backward-looking trust that all will somehow yet be well are, as these very books might teach, an insufficient equipment with which to meet what does seem to be ahead. Conservatism, in a phrase, must continue to be revolutionary in its technique.

In the last hundred years the human race has multiplied three-fold. In 1840 there were some 700 millions of us; now we are about 2,200 millions. In the next fifty years there will be a further and still more critical increase — unless the worst happens meanwhile. Too much reflective attention cannot be given to this fact. It is far more relevant to the problems of our age — and especially to the future of the humanities — than has yet been generally realized. Quantitative factors, unless technique is developed in commensurate degree, can settle qualitative possibilities — disastrously.

Another new fact, even newer and more momentous, is equally relevant, though it is not so easy to state. ***Minds have become more exposed than ever before.*** (If any point deserves italics, this does.) And this exposure too is undergoing explo-

sive increase. Mental and moral communications, within each culture and between cultures, have suddenly expanded beyond anyone's power to foresee the consequences. The agencies at work — with one exception — hardly need more than mention. They are mass education, with its stress on verbal or nominal literacy, radio, motion pictures, modern advertising, and — here is the exception — modern scholarship. These are the new forces which already expose every urbanized mind to a range and variety and promiscuity of contacts unparalleled in history. And this is but beginning. Already some of the effects are showing. It would not perhaps be a culpable exaggeration to suggest that this expansion of our spiritual communications — and the power of minds to influence other minds which goes with it — has already made two wars of a world scale possible. There will at least be no doubt that this new mental exposure makes immense changes necessary in our conceptions of what the humanities have to do and how they can do it. Let us take a brief look at these agencies in action.

Mass education is of course our hope — our one hope, maybe. But in so far as it must use classrooms, how are we to get teachers able to give their pupils any power to select from among the influences to which they become ever more open? Present economic and social conditions repel almost all who might be capable of doing so, and teaching conditions frustrate those whose imagination and devotion still make them enter the profession. And through the decline of the family and for a thousand other well-known reasons there is now incomparably more for the teacher to do. The humanities, being the hardest things to teach, suffer most. They are the hardest to teach because wisdom, which they exist to nourish, cannot be cut and dried. Much in other subjects can.

Correspondingly the preparation of a teacher in the humanities is the hardest of all — which brings me to the not, as yet, sufficiently vexed topic of modern specialized scholarship. I have to explain its appearance in my list of disruptive agencies threatening the wholeness of present and future minds.

Modern scholarship is a fearful and wonderful as well as an unprecedented thing. It is unprecedented, I believe, in character as well as in scale, though I would listen eagerly to a modern scholar who was interested in just this historical question. Like so much else which should give us pause, modern scholarship is the product of admirably ingenious innovations in technique, on which Thamus' words to Theuth (*Phaedrus* 275) are to the point: "Most ingenious Theuth, one man has the ability to beget an art, another to estimate the good or harm it will do to those who are to use it." The words apply equally to the ingenious doings of the nuclear physicists and to all inventions which may threaten us with nuclear fission of our minds. In scholarly technique the innovations are the modern dictionary, the book index, bibliography, the specialized journal, and the museum. Most of them seem to be eighteenth century inventions. At any rate, as they affect us today they are recent. And it is relevant to note that Chinese scholarship only admitted an index to a book within the memory of those still living. In the days when the Chinese tradition was a potent force for unity and peace an index was thought to be a subversive thing which would lead to superficiality and to disrespect for the teacher's authority — grounded on long and deep familiarity with a corpus rather than on quick glances at references.

However this may be, modern scholarship certainly requires ever more intensive and prolonged training of a sort which is of hardly any value to a teacher in general education. It is training in the administration of a vast body, an illimitable proliferation rather, of facts, comments, opinions, and mere phrases, too extensive and diverse to form, in any mind not of a very rare order, any coherent, much less any directing or confirming, view of essential human purpose. Moreover, since this proliferation proceeds geometrically, training in its administration, as we well know, becomes departmentalized, then subdepartmentalized, and scholarship, in so far as it is *that*, becomes less and less useful to a teacher. It may fit him to continue as a specialized researcher — within "areas" or on

"points" with no known relevance to any side of the world crisis. It quite certainly does not give him what he needs as a teacher of the humanities — reasonably considered views of a person's human relations to other persons. Worse still, it is intensive distraction from the hard essential task of maturing such views. Worst of all, this training has now become professional qualification offered competitively by rival institutions.

I would not be misunderstood here. This recent achievement of a method by which scholarship becomes accumulative and responsible to a controlled record is one of the glories of our age. It ranks with the partly parallel achievements in mathematics and experimental inquiry. Together with them it holds out infinite promise to man, and must go on. But, for the time being, as with physics, biology, and psychology (on which last I touch later) its present dangers rather than its remote promises should concern us most. It is preventing us from supplying our greatest need — teachers able to help humanity to remain humane.

Literature — a deep enough *and leisurely enough* familiarity with what the best minds have thought and felt about people — used to produce such teachers. Modern scholarship positively gets in the way. The critical apparatus of approach to the great things keeps them from their would-be student. He is daunted incessantly by the thought that somewhere there is something which would, if he only knew it, help him to understand better. He comes to distrust the direct approach, and lives in an unhealthy terror of his ignorance — which will anyhow for all men and to time's end be infinite. He forgets that we do not help ourselves or others by collecting more facts and comments, but by understanding more clearly our problems and theirs by seeing them through the eyes of the best minds. So we lose our best teachers.

To turn now to mass media. Radio and the motion picture might provide some remedy for this loss. It is possible to believe, sometimes, that they could become the instruments of our salvation. But we will agree, without difficulty, that they are not that now — for well-known and chiefly technical reasons. Radio and the motion picture propagate most successfully the most superficial, the most facile, and the least educating elements of a culture. This is partly because, as programs, they have to *go on*. They have to change, every fifteen minutes or twice weekly. There is no time for what they present to be deeply pondered, thought over, returned to and considered afresh. Therefore, it rarely is worth such reconsideration. But in every culture it has been the things which received the most lasting and recurrent attention — the books re-read again and again, the stories and sayings known and familiar from infancy to old age, the rites repeated throughout a lifetime, the perennial monuments, the enduring ideas, the constant aesthetic institutions — which have done the most part of the work of humanities. Mass media, at present, replace such continuous shaping forces by an incessantly shifting play of light and confusing impacts. It is not surprising that they are of little help in seeing life steadily and seeing it whole.

For these and other reasons, just when the humanities are more than ever needed and at a decisive turn of human fate, they are becoming through multifarious distraction — ranging from the movie to the graduate school — inoperative and ineffective. But what is this turn of fate? It is the juncture, at last, of the sciences with the humanities. A juncture is a meeting together, a convergence of different principles into one event; it is also a crisis. What are meeting now head on are two unreconciled ways of conceiving man and his good and how to pursue it. Both wish him well, but they differ radically as to how he can be helped. The physical and social sciences alike — being applications of methods of observation and calculation — conceive men as units subject to forces playing upon them *from without*. A man is a complex unit, no doubt — the psychologist is the last man to overlook this — but differences between men are, for science, to be accounted for in terms of past influences (genes, prenatal supply, early nurture, education, etc.) and present conditions. Any inquiry based upon

experimentation and comparison develops such a conception; it abstracts, in its own defense, from other aspects. Thus a man's desires and opinions and beliefs, the springs of his action and sources of his triumphs or sufferings, are likewise, for science, to be studied from without. If they are investigable at all by science, they must be public and they must be manipulatable; that is the methodical crux. It is the modes of such manipulation and the resultant behavior which are really being studied. To the psychologist education is control of *behavior*. Not unnaturally, therefore, mass influence techniques, by which groups in Germany, Japan, and elsewhere have controlled the behavior of vast masses of population (though the behavior was unfortunate) have come to offer — to better hands, no doubt — alluring prospects of doing man good even against his will.

In contrast, the humanities pin a faith, which is experimentally still ungrounded, on the ideal autonomy of the individual man. He is happiest who is least able to be changed from without, as Socrates averred (*Republic*, 381). Man is not a thing to be pushed about, however kindly or beneficently. He is a spirit who learns — not as a slave learns (*Republic*, 536E), but by exercising the freedom which is his being.

I should illustrate this opposition. I may do so best by an extract from page 18 of *Who Shall Be Educated?*, by Lloyd Warner and R. J. Havighurst, though the authors would, I hope, be horrified by the implications I am about to find in their sentences.

> We will look at our American social system, which largely controls our behavior, much as we would at a complex maze in which animals learn to behave. In such a system we must be taught to learn our way around as we grow up if we are to live normal lives and to behave normally as adults. This is true for all the Tom Browns, Katherine Greens, and Joe Sienkowitzes of our society. Growing up consists in learning how to behave, and learning how to behave means acquiring the proper responses to the batteries of social stimuli which compose our social order.

It is the last sentence to which I would draw most attention. Should "learning how to behave" mean anything like that? To a humanist (or a Platonist) it should mean learning the *what's* and *why's* of human good — what man's duties and responsibilities and his right relations to his fellows are, and learning how to stick to them under the terrible pressures of pleasure and pain — stronger than any lye or potash (*Republic* 430) — which forever try to force us from them. We only learn through understanding the differences and connections between things. It is possible, no doubt, to load the phrase "acquiring the proper responses" with all this moral teaching. If we do so, of course, all is well! And I will only have been expounding for my authors their full intention. But is that what the sentence suggests? Does it not much rather suggest some smooth adjustment to and conformity with current fashions in morals, a facile acquiescence in socially acceptable mass-circulated doctrine?

Speaking of fashions, we need be no very deep students of social science to know that the heaviest massed "batteries of social stimuli" directed upon young and old today are the ads. I listed advertisements among the disruptive agencies to which minds are now more exposed than ever before. It seems agreed that Goebbels and his gang learnt much from American advertising techniques. Even though we believe in the virtues of immunization to such attacks, we will do well to consider more seriously than is customary what the ads may be doing today to the humanities. Consider Christmas for a moment.

> O never rudely will I blame his faith
> In the might of stars and angels

wrote Coleridge. But how about using the might of stars and angels in an attempt to sell one's wares? What's wrong about that? On a page of both stars and angels, under a caption: "*And the Angels bring . . .*" we look to see what they do bring, and read, "*Heavenly gift robes and lingerie along the moon-lit trail leading to our star-studded Christmas collection . . . LUCKY STAR, above left . . . is all dressed up to go lounging in a cherubic rayon crepe . . . Radelle Constellation . . . shining brightly on the angel's arm, dream gown of celestial rayon . . . matching figure-molding slip*

for heavenly array . . ." not to mention "*panties that lovely women prefer to wear behind the 'seens'*," and lastly, that no insult should be lacking, "*MOONLIGHT MADONNA GOWN!*" To attend for a second seriously to such exploits will make one wonder if he has lost his sense of humor. But it is more unwise never to reflect upon what an incessant exposure to this sort of thing may be doing to us, if only to the language which channels our inheritance. I have shown this ad to a meeting of teachers of English. My chairman, a superintendent of secondary schools in a great city, took a little umbrage. "Didn't it at least show," he asked, "that the writer had profited by a sound grounding in the classics?" He seemed to think this was a proper outcome of a literary education.

We fail, I think, to realize how omnipresent these degradations are, or how much they may blur and disable the spiritual organs they play with and for what mean purposes. Was so much so skilfully designed to enfeeble and betray human judgment ever directed on a previous generation? We need men inspired by Irving Babbitt's noble and tireless scorn to go on pointing to them. I will add but one example — Edison Company placarding the subways in wartime with a bright-windowed villa thus legended: "*In a World of Darkness be thankful for the Light Within*" or some such words. The light within — meaning their products! The strange and dismaying thing about all this is that to those responsible it will be the idea that there is anything objectionable here which will be strange. For this is not blasphemy. Would that it were! It is trivialization, which is more dangerous. Blasphemy provokes. The trivialized mind is supine, at the mercy of slick manipulators. The outcome can be generations of dehumanized social animals in place of self-controlled, self-judging, self-ruling men and women.

Manipulation and exploitation — for the benefit of the operator, not of the subject — that is the chief danger man incurs through the decline of the humanities. The humanities are his defense against emotional bamboozlement and misdirection of the will. The student of science — without the support of that which has been traditionally carried by literature, the arts and philosophy — is unprotected; the main doctrines and positions which keep man humane are insusceptible, at present, to scientific proof. Present-day science, in fact, like dialectic in Plato's day (*Republic* 539) or popular philosophising in pre-Nazi Germany, tends to break them down. Without a vigorous and widespread upkeep of the humanities every country comes to be populated chiefly with "supposititious sons" (*Republic* 538). And science in the absence of the traditional communal loyalties can only supply their lack by indoctrination in what will probably be (as the samples run so far) nationalistic myths. Dangers due to new weapons will heighten men's susceptibility to such doctrines and also the temptation to teach them. Thus a very gloomy prospect looms up — deriving radically both from the decay of the humanities and from the exuberant vitality of the applied sciences.

It is not, however, the probability of more, and far more destructive, wars which most alarms a humanist. Circumstances are today too easily imaginable in which planetary disintegration would be a welcome release. What is daunting is the possibility that man may be permanently warped through these tensions — that the ideals which made him human may be destroyed — *before* their work can be taken over by science. For that science — or something into which science, given time and education by the humanities, can develop — is the inheritor of their task seems to me a tenet that no true humanist, remembering Book VII of his *Republic*, can yield, any more than he can truly, as a humanist, despair of man.

The current crisis, to sum up, is *cultural*. One part of man's capacities, science, oversuddenly developed, has drained the life temporarily from even more necessary abilities, the humanities. Science now offers an alluring alternative path to human good, while at the same time showing more immediate probabilities of working colossal evils on us than some humanists can bear to face. So they prattle of "the atomic jitters," pose as more heroic than the rest of us and mislead the thoughtless.

But the remedy is not in posturing but in work. "*L'heure est à la construction pas au badinage*," as Le Corbusier Saugnier remarked a quarter of a century ago. What the humanities need, if they are to have a future as well as a past, is, first, a realizing sense of their present position. Secondly, they need decisions as to priorities, as to what in their teaching is most essential to their own survival. A full sense of their danger will produce these. Thirdly, they need to take to heart, and deeply, a number of lessons from the sciences about cooperative endeavor addressed, step by step, to foreseen ends. Lastly, they need a plan for the teaching of these essentials — skills and contents — a plan for ordering advance into the humanities comparable to the plans the sciences use. There is no reason why our present higgledy-piggledy, promiscuous style of scattering the seeds of wisdom — mixed with the puffed wheat — in would-be students' minds should long continue once the supreme and immediate need for wiser ways is seen.

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